ENVIRONMENTAL ASSESSMENT

Beddown of C-5M Super Galaxy Formal Training Unit

Final

DOVER AIR FORCE BASE

March 2011

Prepared by:

GMI

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14. ABSTRACT

Air Mobility Command has directed the beddown for the C-5M FTU at Dover AFB pending Environmental Impact Assessment Process analysis, to achieve initial operability by Fiscal Quarter (FQ) 2/2012, and full training production of approximately 106 pilots and 46 flight engineers per year by FQ 1/2016. This EA is being prepared in accordance with the National Environmental Policy Act (NEPA) (Public Law 91-190, 42 United States Code [USC] ?4321 et seq.), Department of the Air Force Regulation, Environmental Impact Analysis Process (32 Code of Federal Regulations [CFR] ?989), and the Council on Environmental Quality (CEQ) implementing regulations (40 CFR ??1500-1508). This EA assesses the potential impacts associated with implementation of the Proposed Action to construct new training and administrative facilities and conducting training for pilots and aircrew, or selection of the No Action Alternative. As required by NEPA, the No Action Alternative serves as the environmental baseline against which to compare the potential environmental impacts of the Proposed Action. The Proposed Action would be comprised of approximately 5 Instructor Pilots and 5 Instructor Flight Engineers who would train approximately 106 pilots and 46 flight engineers annually (24 students at a time), and would involve the use of 2 Weapon System Trainers and a Cockpit Procedural Trainer. Approximately 8,275 square feet of classroom and administrative space would be constructed by rehabilitating existing Building 206 in the administrative area of Dover AFB, in combination with temporary trailers, and new Military Construction of an addition to Building 206, scheduled to be completed by FQ4/2013 at an estimated cost of $3.2 million. Use of training aircraft would not require any new Dover AFB airfield construction and no additional aircraft are proposed to be stationed at Dover AFB. Under the Proposed Action, approximately 336 additional C-5M sorties are planned annually, resulting in approximately 1,350 additional annual flying hours. Flying operations (the sum of all departures, arrivals and closed pattern activity) would increase up to 8.9% under the Proposed Action. Resources evaluated include airspace use and management, noise, air installation compatibility use zone/land use, air quality, water resources, soils, socioeconomics and environmental justice hazardous materials and wastes, and safety. Direct and indirect effects were assessed for each environmental resource or issue, considering short-term and long-term project effects and cumulative impacts. Although construction activities would affect the natural and human environment, most impacts would be temporary and minor. No negative cumulative impacts to resources or issues would be expected from implementation of the Proposed Action.

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FINDING OF NO SIGNIFICANT IMPACT

Environmental Assessment
For the Beddown of a C-5M Formal Training Unit at
Dover Air Force Base, Delaware

Agency: United States Air Force, Air Mobility Command.

Background

The U.S. Air Force proposes to establish, operate, and maintain the C-5M *Super Galaxy* Formal Training Unit (FTU) at Dover Air Force Base (AFB), Delaware. Specifically, the FTU would provide training to aircrews transitioning from the C-5 *Galaxy* to the C-5M *Super Galaxy* aircraft that have been modified to use quieter, more fuel efficient engines, and whose avionics have been upgraded. Beddown of the proposed FTU would include facility development, additional training flights, and classroom training for pilots and flight crew.

The primary purpose of the Proposed Action is to fulfill the Air Force and 436 AW mission of providing strategic airlift of U.S. forces when needed around the globe, and humanitarian airlift in times of natural disasters. In order to extend the life cycle of the C-5 program to meet that mission, Congress approved modifications to 52 of the C-5 *Galaxy*, which have been upgraded with over 70 improvements addressing avionics, fuel consumption, noise, and reliability deficiencies of the aging aircraft. The improved C-5M *Super Galaxy* aircraft have different handling properties and maintenance requirements for which personnel need to be trained for their use and maintenance. The need of the Proposed Action is therefore to provide training the purpose of which is furthering the airlift mission of the 436 AW. The AMC has directed the beddown for the C-5M FTU at Dover AFB, pending EIAP analysis.

Pursuant to the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) implementing regulations, (40 CFR §§1500-1508) and the Air Force Environmental Impact Analysis Process (32 CFR §989), the Air Force has prepared an Environmental Assessment (EA) analyzing the potential environmental impacts of the Proposed Action to construct new training and administrative facilities, and conduct training for pilots and air crews in operation and maintenance of the C-5M aircraft. The EA evaluates potential impacts from the Proposed Action and a No Action Alternative that serves as an environmental baseline

for comparison. Potential cumulative impacts are also evaluated and an assessment of irreversible and irretrievable resource commitments made.

Proposed Action

The Proposed Action would include the stationing at Dover AFB of approximately five Instructor Pilots and five Instructor Flight Engineers who would train approximately 106 pilots and 46 flight engineers annually (24 students at a time), and would involve the use of two Weapon System Trainers (WST) and a Cockpit Procedural Trainer (CPT). Approximately 8,275 square feet of classroom and administrative space would be constructed by rehabilitating existing Building 206 in the administrative area of Dover AFB, in combination with temporary trailers, and new Military Construction of an addition to Building 206, scheduled to be completed by FQ4/2013 at an estimated cost of $3.2 million. Prior to initiation of construction activities, plans and documents would be prepared by the contractor to provide environmental controls and implementation of best management practices (BMPs). These plans and documents would be submitted to Dover AFB for review and approval.

Given the projected syllabus duration and student throughput, it was determined that existing billeting facilities were adequate both in terms of quality and quantity of rooms. Students would utilize rental cars or personally owned vehicles to access the administrative/training facilities. Transportation from the training facilities to the parked aircraft would rely upon existing infrastructure; the estimated increase in vehicular traffic between the training facilities and the parked aircraft would consist of 6 trips per day (1 each way for 2 flights; 1 each way from the ground trainer) utilizing two 15 passenger vehicles.

No additional aircraft would be required to support the FTU nor are any proposed to be stationed at Dover AFB. A new hangar, previously programmed for construction, may be utilized and a mobile tail enclosure hangar (on wheels) may be acquired. Training flights would increase required maintenance of the C-5M *Super Galaxy* aircraft, consuming more fuel, oil, and other related products.

Under the Proposed Action, approximately 336 additional C-5M sorties are planned annually, resulting in about 1,350 additional annual flying hours. This corresponds to about 2 sorties a day on a Monday through Friday training-day schedule. One day sortie and one night sortie would

fly, within half-hour windows before sunrise and after sunset to minimize conflicts of aircraft with peak bird occurrence on the airfield.

Alternatives to the Proposed Action

In an effort to satisfy the purpose and need for the Proposed Action, several selection criteria were developed to compare and contrast alternative ways of fulfilling the objectives of the Proposed Action in accordance with 32 CFR §989.8(c). Those specific criteria include:

1. **Conformance (generally) with an Installation General Plan adopted in 2008.** The development of administrative and flight training facilities associated with the beddown of the C-5M FTU must not conflict with long-range plans for base development and should further the installation's development plans by focusing future construction and land use changes into compatible areas. The goals and strategies for developing the installation (including re-capitalizing existing infrastructure) are set forth in the Installation General Plan; its principal strategy is to maximize functional relationships, and provide for efficient use of buildings, real estate, and existing infrastructure. The Installation General Plan identifies a series of development constraints on new and in-fill development such as airfield safety, munitions storage safety, noise compatibility, presence or absence of ground contamination, cultural resources or sensitive habitat and the like. Its composite constraint maps depict where on the installation development of a certain-sized parcel of land would be feasible.
2. **Site aircrew training facility within walking distance of simulator. The CPT simulator is previously installed in Building 206.**
3. **Site flight-line training facilities within walking distance of Aircrew Training System (ATS) facility.**
4. **Find a site of sufficient size to accommodate approximately 8,275 square feet of constructed administrative/training space and associated off-street parking.**
5. **Find a location with an existing C-5M mission with access to existing, adequately sized facility to minimize land disturbance and expense.**
6. **Minimize potential adverse environmental effects through avoidance, design, and mitigation**. To the greatest extent feasible, the construction of facilities associated with

the beddown of the C-5M FTU should minimize adverse environmental effects. In general, sites with historic properties, sensitive habitats for protected species, and wetlands should be avoided.

7. **Find a location that can support initial first qualification class students by 2012.**

Alternate locations for the siting of the C-5M FTU training facilities have been considered but have been determined unreasonable and/or did not meet purpose and need. These locations included Travis AFB, Lackland AFB, and Westover Air Reserve Base. All three alternate locations were eliminated on the basis that they did not have an active C-5M mission in place and could not support initial first qualification class students by 2012. General conformance to the Installation General Plan goals and known composite constraints as identified in that plan, coupled with the need for siting the ATS Facility near the CPT Simulator and the Flight-line Facility within walking distance of the ATS Facility have limited potential locations for beddown of the FTU to the vicinity of Building 206.

The No Action Alternative has been carried forward as the baseline against which potential impacts arising from the action alternatives can be measured. Under the No Action Alternative, the C-5M FTU would not be beddown at Dover AFB.

ENVIRONMENTAL IMPACTS

Potential effects from the implementation of the Proposed Action, including cumulative impacts are summarized below:

Air Space Use and Management

Implementing the C-5M FTU beddown at Dover AFB would increase C-5 sorties by approximately 25%, from an estimated 552 annual aircraft sorties to approximately 626 C-5M annual sorties. This C-5 sortie increase translates to an increase of 3,175 aircraft operations annually because each sortie consists of an arrival, a departure and a variable number of closed circuit (touch and go) traffic pattern operations. Nearly 9,000 operations per year represent approximately a 10% increase in the overall operations at the airfield. Currently, the runway geometry and taxiway configuration at the Dover AFB's airfield has the capacity to handle the existing C-5 operations as well as those of the proposed C-5M FTU, and other based and

transient aircraft that would use the airfield. The current Air to Surface Vessel Radar capacity that would be utilized would increase by 4% from 13% to 17%.

The anticipated 25% increase from C-5M FTU aircraft operations activity would not be sufficient to make the airspace surrounding Dover AFB a candidate for a more restrictive Class C airspace; no changes to airport traffic patterns, instrument flight procedures, or air traffic control procedures are anticipated or proposed under the Proposed Action. The effect on airfield capacity utilization anticipated from potential implementation of the Proposed Action would be minor. Dover AFB's Radar Approach Control facility, working in conjunction with the Terminal Radar Control facilities serving airports in the region, work in concert with each other and the air route traffic control centers that control the overlying Class E airspace over Dover to separate all civil and military aircraft flying under Instrument Flight Rules (IFR) within controlled airspace in the region.

The Proposed Action would not create a need to establish additional or new controlled airspace. The predominate operation type for the C-5M FTU would be closed pattern operations, typically under Visual Flight Rules (VFR) and contained within the Class D airspace. To the extent that this increased utilization does occur, civil users operating under IFR to nearby airports would continue to use standard instrument arrival and departure procedures into those airports, and no delays and/or holding would be expected. Class D airspace does have a requirement to establish two-way communications for entry for air traffic operating under VFR, while operations within Class E airspace have no such requirement. The projected increased C-5M operations under the Proposed Action would primarily influence operations at landing areas (airfields and heliports) lying within the Dover Class D airspace in the form of slightly increased frequency congestion and potentially increased denial of entry into the Class D airspace due to airspace saturation. The likelihood of such occurrences is mainly a function of air traffic control tower staffing, which is also dependent upon a variety of other factors. Staffing levels would affect the ability of controllers to service all users of the airfield. The number of operations at Dover under the Proposed Action would be similar to those of a smaller, regional air carrier airport which has approximately 36,000 annual aircraft operations. The effect upon air traffic control airspace use and management are thus anticipated to be minor.

The Proposed Action would not materially affect Special Use Airspace or other military training airspace. Except as necessary for takeoffs and landings, or when en route to airports within 150 miles, given its airlift mission and operational characteristics, the C-5M operating in the low-altitude flight strata (below 18,000 feet above Mean Sea Level [MSL]) would seldom occur because jet engines are typically inefficient, and consume excessive amounts of fuel compared to the high altitude strata (above 30,000 feet MSL). Further, C-5M training flights would likely utilize designated Aerial Refueling Track routes over the open Atlantic Ocean, typically at mid- and high-altitude strata (18,000 feet MSL and above), hence there would be little potential for effects to other users of National Air Space.

No significant effect on airspace management or use would occur as no conflicts with air traffic control in the region would be created; no changes to operations within airspace already designated for other purposes would be required; there would be no need to designate controlled airspace where none previously existed; no reclassification of controlled airspace from a less restrictive to a more restrictive classification would be required; and there would be no need to designate regulatory Special Use Airspace for C-5M FTU training or operations.

Noise

No significant negative noise impact would occur either from construction of facilities required by beddown of the C-5M FTU, or increased air operations associated with training. Dover AFB has proposed several additional, relatively minor construction projects during the same period of the Proposed Action. Due to the temporary, short-term, and localized nature of construction noise, no adverse, significant impact from the cumulative effect of all of the past, present or reasonably foreseeable future actions is anticipated. The potential impacts of the Proposed Action are compared to baseline noise conditions at Dover AFB as recently documented in the 2010 Air Installation Compatible Use Zone (AICUZ) study which modeled use of the C-5A/B *Galaxy* aircraft, and did not include the C-5M. Effects are also compared to present conditions (No Action Alternative) where newly modified C-5M aircraft are currently utilizing the Dover airfield independent of a proposed FTU beddown.

Under the Proposed Action, C-5M flight operations would increase by 25% compared to both the baseline AICUZ noise setting and the presently existing noise setting. In general, the area of predicted noise exposure above 65 A-weighted decibels (dB(A)) would diminish compared to the baseline noise setting and increase slightly compared to that presently experienced. The

reduction compared to the baseline noise setting is due in large part to substantially quieter engines as well as their increased performance, which allows the aircraft to climb more rapidly, thereby increasing the distance from the source to the receiver. The acreage encompassed within the 65 dB(A) noise contour would decrease from baseline conditions which did not include C-5M aircraft, and slightly increase from present conditions in which some C-5M aircraft use the Dover AFB airfield.

The change to quieter engines achieved by converting the C-5 would substantially reduce the predicted noise exposure contours in comparison to baseline conditions. The current analysis bases the predicted noise contours on the assumptions that the entire C-5 inventory stationed at Dover would be converted to the quieter C-5M engine, and that transient C-5 aircraft would not be converted. However, since the conversion of individual aircraft to the C-5M is subject to future funding, the model assumptions may not be realized. The implications of this uncertainty in the program, its corresponding effect on noise from aircraft operations, and the effect those changes would have on AICUZ and land use planning recommendations are discussed below.

Land-use compatibility recommendations begin when predicted noise exposure levels exceed 65 dB(A) Day and Night Average Noise Level (DNL). As such, this can also be an indicator of when impacts from noise could be considered significant. For purposes of analysis of aircraft operations at Dover AFB, impacts would be considered significant if the Proposed Action resulted in a 3 dB DNL increase in noise exposure at a sensitive receptor, a level under which noise is not perceptible. No such increase would occur from implementation of the Proposed Action.

Air Installation Compatible Use Zone/Land Use

The increased flight operations of the C-5M FTU beddown would not change the existing flight paths over ground and air traffic control practices, procedures, and policies would remain the same, thus no change to the Clear Zones or Accident Potential Zones would occur that would alter the degree of land use compatibility or incompatibility. Although FTU flight operations would increase 25%, the predicted 65 dB(A) or greater noise contours would be reduced in overall extent and size compared to baseline conditions due to the quieter C-5M engines. Under the Proposed Action, the acreage within the 65 dB(A) or greater contours would shrink from 17,623 to 4,082 acres. Incompatible land use would decrease from 834 baseline acres to 147

acres. Implementation of the Proposed Action would benefit land use compatibility in the vicinity of Dover AFB. Proposed C-5M FTU facilities would be consistent with existing Air Operations and Administrative Area designated use areas as identified in the 2008 Installation General Plan.

Air Quality

Implementation of the Proposed Action would have both temporary and minor impacts to the local air quality. No significant cumulative impacts would be expected. Calculated emissions from the proposed construction activities would be below *de minimis* values for criteria pollutants. The associated emissions would be considered insignificant and not affect the local air quality. Although C-5M training flights would increase operations 25%, the cleaner new engines of these aircraft would emit fewer emissions than presently realized, and would remain below *de minimis* values. Therefore, a Record of Non-Applicability has been prepared for the Proposed Action and the General Conformity Rule does not apply.

Water Resources

Temporary and localized adverse impacts to water quality may occur from earth disturbance associated with facility construction for the proposed C-5M FTU beddown. Runoff from the construction site could introduce sediments and other pollutant loading from disturbed soils into adjacent surface waters, however, this potential would be minimized by use of erosion control Best Management Practices (BMPs).

Soils

Short-term, localized adverse impacts associated with ground disturbance may occur during construction activities. These impacts would be minimized through the use of erosion and sedimentation control measures and BMPs for heavy equipment use.

Socioeconomics and Environmental Justice

Slight beneficial impacts to the local and state economy would occur from expenditures associated with the Proposed Action. There would be no significant negative impact to demographics, income or employment from the Proposed Action, therefore no highly adverse disproportionate impacts to minority or low-income populations would occur. As the noise generated by the increased C-5M FTU training flights would be less than existing baseline

conditions, no highly adverse disproportionate impacts to minorities or low income populations would occur from increased flights associated with the FTU. No negative cumulative impacts would be expected.

Hazardous Materials and Wastes

Implementation of the Proposed Action could consume hazardous materials and/or generate hazardous wastes such as fuels, paints, glues, and asphalt materials. Beddown of the C-5M FTU would increase required aircraft maintenance and associated materials use such as fuel, oil, tires, and the like. These substances would be handled and disposed of as directed by Dover AFB management plans. Environmental Restoration Program (ERP) Site ST05 is an old fuels storage area located in the vicinity of proposed facility construction. Facility development of the Proposed Action may disturb contaminated surface soils, but these would be treated and disposed of in accordance with applicable Federal, state, and local regulations. The potential construction impacts would be short-term, ending with completion of facility development. No significant negative impacts involving hazardous waste or substances would occur from implementation of the Proposed Action.

Safety

Beneficial impacts to safety would occur under either the Proposed Action or the No Action Alternative compared to baseline conditions because the C-5M modernization program improves the reliability and performance of the engines, and equips the aircraft with more modern avionics. As such, despite a slight increase in overall air operations at Dover, no significant change in risk exposure would occur from the Proposed Action or the No Action Alternative as a result of increased flight operations.

No impacts to safety as it relates to occupational health are anticipated from the proposed construction activities or proposed ongoing operations of the FTU. Existing standards and regulations govern and would be adhered to, leaving the overall level of risk exposure unchanged.

Cumulative Effects

The CEQ regulations stipulate that the cumulative effects analysis within a EA should consider the potential environmental impacts resulting from the incremental impacts of the action when added to other past, present and reasonably foreseeable actions, regardless of what agency or person undertakes such other actions (40 CFR §1508.7). Cumulative effects most likely arise when a relationship exists between a Proposed Action and other actions expected to occur in a similar location or during a similar time period. The incremental contribution of impacts of the Proposed Action, when considered in combination with other past, present, and reasonably foreseeable actions, are not expected to have significant long-term negative impacts to any of the resource areas analyzed. Short-term, negative direct impacts to air, water and soil resources may occur during the construction of the additional administrative space, yet these are not expected to be significant.

Irreversible and Irretrievable Commitment of Resources

NEPA requires that environmental analysis include identification of any irreversible and irretrievable commitments of resources which would be involved in the Proposed Action, should it be implemented. Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources, and the effects that the use of these resources has on future generations. Irreversible effects primarily result from the use or destruction of a specific resource that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action. For the Proposed Action, no irreversible or irretrievable resource commitments would result.

Public Comments

The Draft EA was made available for public comment from February 19 to March 21, 2010 and notice of its availability provided by advertisement in the Delaware State News on February 20 and 23. No comments were received.

FINDING OF NO SIGNIFICANT IMPACT

Based upon my review of the facts and analyses contained in the attached EA, I conclude that the Proposed Action will not have a significant environmental impact, either directly or cumulatively, in conjunction with other projects at Dover AFB. Accordingly, the requirements of NEPA, CEQ regulations and the Air Force Environmental Impact Analysis Process are fulfilled and the preparation of an Environmental Impact Statement is not required.

Signed:

Joan H. Garbutt

JOAN H. GARBUTT, Colonel, USAF
Commander, 436th Mission Support Group

11 May 11

Date

ENVIRONMENTAL ASSESSMENT
For the Beddown of a C-5M Formal Training Unit

DOVER AIR FORCE BASE, DELAWARE

Lead Agency: Department of the Air Force, Air Mobility Command

Proposed Action: The U.S. Air Force proposes to establish, operate, and maintain the C-5M *Super Galaxy* Formal Training Unit (FTU) at Dover Air Force Base (AFB), Delaware. Specifically, the FTU would provide training to aircrews transitioning from the C-5 *Galaxy* to the C-5M *Super Galaxy* aircraft that have been modified to use quieter, more fuel efficient engines, and whose avionics have been upgraded. Beddown of the proposed FTU would include facility development, additional training flights, and classroom training for pilots and flight crew.

Written comments and inquiries regarding this document should be directed to: Mr. Steven Seip, 436 CES/CEAN, 600 Chevron Avenue, Dover Air Force Base, Delaware 19902-5600, (302) 677-6839**.**

Report Designation: Final Environmental Assessment (EA)

Abstract: Air Mobility Command has directed the beddown for the C-5M FTU at Dover AFB, pending Environmental Impact Assessment Process analysis, to achieve initial operability by Fiscal Quarter (FQ) 2/2012, and full training production of approximately 106 pilots and 46 flight engineers per year by FQ 1/2016. This EA is being prepared in accordance with the National Environmental Policy Act (NEPA) (Public Law 91-190, 42 United States Code [USC] §4321 et seq.), Department of the Air Force Regulation, Environmental Impact Analysis Process (32 Code of Federal Regulations [CFR] §989), and the Council on Environmental Quality (CEQ) implementing regulations (40 CFR §§1500-1508). This EA assesses the potential impacts associated with implementation of the Proposed Action to construct new training and administrative facilities and conducting training for pilots and aircrew, or selection of the No Action Alternative. As required by NEPA, the No Action Alternative serves as the environmental baseline against which to compare the potential environmental impacts of the Proposed Action.

The Proposed Action would be comprised of approximately 5 Instructor Pilots and 5 Instructor Flight Engineers who would train approximately 106 pilots and 46 flight engineers annually (24 students at a time), and would involve the use of 2 Weapon System Trainers and a Cockpit Procedural Trainer. Approximately 8,275 square feet of classroom and administrative space would be constructed by rehabilitating existing Building 206 in the administrative area of Dover AFB, in combination with temporary trailers, and new Military Construction of an addition to Building 206, scheduled to be completed by FQ4/2013 at an estimated cost of $3.2 million. Use of training aircraft would not require any new Dover AFB airfield construction and no additional aircraft are proposed to be stationed at Dover AFB. Under the Proposed Action, approximately 336 additional C-5M sorties are planned annually, resulting in approximately 1,350 additional annual flying hours. Flying operations (the sum of all departures, arrivals and closed pattern activity) would increase up to 8.9% under the Proposed Action.

Resources evaluated include airspace use and management, noise, air installation compatibility use zone/land use, air quality, water resources, soils, socioeconomics and environmental justice,

hazardous materials and wastes, and safety. Direct and indirect effects were assessed for each environmental resource or issue, considering short-term and long-term project effects and cumulative impacts. Although construction activities would affect the natural and human environment, most impacts would be temporary and minor. No negative cumulative impacts to resources or issues would be expected from implementation of the Proposed Action.

EXECUTIVE SUMMARY

This Environmental Assessment (EA) analyzes the potential environmental consequences resulting from the proposed establishment, operation, and maintenance of the C-5M *Super Galaxy* aircraft Formal Training Unit (FTU) at Dover Air Force Base (AFB). Specifically, the FTU would provide training to aircrews transitioning from the C-5 *Galaxy* to the C-5M *Super Galaxy* aircraft that have been modified to use quieter, more fuel efficient engines, and whose avionics have been upgraded. The environmental analysis process is designed to ensure the public is involved and informed about the potential environmental effects of a Federal action, and to help decision makers take environmental factors into consideration when making decisions related to the Proposed Action. The assessment of the potential environmental impacts of the Proposed Action is administered by the Air Force Center for Engineering and the Environment (AFCEE), Air Mobility Command (AMC), and the 436 Airlift Wing (AW) Mission Support Group, Civil Engineering Squadron, Asset Management Flight (CES/CEAN) at Dover AFB.

Scope of This Environmental Assessment

This EA was prepared in accordance with the National Environmental Policy Act (NEPA) (Public Law 91-190, 42 United States Code [USC] §4321 et seq.), Department of the Air Force Regulation, Environmental Impact Analysis Process or EIAP (32 Code of Federal Regulations [CFR] §989), and the Council on Environmental Quality (CEQ) implementing regulations (40 CFR §§1500-1508). In accordance with CEQ guidance (40 CFR §1508.9), when it is not immediately clear whether a Proposed Action may have significant impacts as defined by NEPA, an EA is prepared to briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement (EIS) or a finding of no significant impact (FONSI).

Purpose and Need for the Proposed Action

The primary purpose of the Proposed Action is to fulfill the United States Air Force (Air Force) and 436 AW mission of providing strategic airlift of U.S. forces when needed around the globe, and humanitarian airlift in times of natural disasters. In order to extend the life cycle of the C-5 program to meet that mission, Congress approved modifications to 52 of the C-5 *Galaxy*, which have been upgraded with over 70 improvements addressing avionics, fuel consumption, noise, and reliability deficiencies of the aging aircraft. The improved C-5M *Super Galaxy* aircraft have different handling properties and maintenance requirements for which personnel need to be

trained for their use and maintenance. The need of the Proposed Action is therefore to provide training the purpose of which is furthering the 436 AW's mission of providing airlift. The AMC has directed the beddown for the C-5M FTU at Dover AFB, pending EIAP analysis

Proposed Action and Alternatives

Proposed Action

The Air Force proposes to locate the C-5M FTU at Dover AFB to train approximately 106 pilots and 46 flight engineers annually. The FTU would include approximately 5 Instructor Pilots and 5 Instructor Flight Engineers, and involve the use of 2 Weapon System Trainers (WST) and a Cockpit Procedural Trainer (CPT). The facilities required to support the FTU consist of an Aircrew Training System (ATS), a contractor-operated flight simulator training section, and the flight-line aircraft training section. In order to support these additional facilities, approximately 3,525 square feet of instructor offices, computer-based training rooms, scheduler/registrar, publication/storage area, and instructor review rooms would be required for the ATS. In addition, the Active Duty Flight-line training facility as currently planned would require about 4,750 square feet of instructor offices, classrooms, a break room/computer room, a conference room, and storage area.

The location for proposed facility development is in the administrative area of the base in proximity to the airfield. Facility requirements would be met by rehabilitating 2,275 square feet of Building 206 and use of temporary trailers, while the remaining 6,000 square feet required would be obtained through a Fiscal Year (FY) 2012 Military Construction (MILCON) project that would construct an addition to Building 206. The Proposed Action provides for phased implementation of the beddown both in terms of facility development and number of personnel trained. FTU operations would be scheduled to initiate in Fiscal Quarter (FQ) 2/2012 with an operational WST by FQ 2/2012 and an additional WST by FQ 4/2012. A CPT is already housed in Building 206.

Construction of the new facilities would be phased with 3,000 square feet of administrative space provided by the use of temporary trailers by October 2012, followed by the rehabilitation of space in Building 206, and then new construction. All this is currently scheduled to be complete by FQ4/2013. No new offsite utility construction would be required as existing utilities have sufficient capacity to accommodate the new facilities. Total estimated cost of facility development is $3,200,000.

A feasibility study conducted by AMC determined both on and off installation existing transient housing would be sufficient to meet the additional influx of student pilots. Existing infrastructure also is sufficient to accommodate the increase in vehicular traffic between the training facilities and parked aircraft. The use of training aircraft would not require the construction of new runways, additional ramp/apron aircraft parking, or navigation, communication, or airfield lighting. However, a planned new hangar may be utilized by the FTU and a mobile tail enclosure hangar may be acquired. Further, FTU training flights would increase required maintenance of the C-5M *Super Galaxy* aircraft, consuming more fuel, oil and other related products.

The Proposed Action would not station additional aircraft at Dover AFB. Under the Proposed Action, approximately 336 additional annual C-5M sorties would result in about 1,350 additional annual flying hours on a Monday to Friday schedule. One day sortie and a night sortie would fly within half-hour windows before sunrise and after sunset; this would minimize conflicts of aircraft with peak bird occurrence on the airfield. Flying operations (the sum of all departures, arrivals and closed pattern activity) typically fluctuate from year to year; but under the Proposed Action, would generally increase up to 8.9% more than baseline and the No Action Alternative activity levels.

No Action Alternative

Although it would not satisfy the purpose and need for the action, a No Action Alternative has been carried forward as the baseline against which potential impacts arising from action alternatives can be measured. The No Action Alternative is carried forward for analysis in accordance with CEQ regulations (40 CFR §1502.14 (d)). Under the No Action Alternative beddown of the C-5M *Super Galaxy* FTU at Dover AFB would not occur.

Summary of Environmental Consequences

It is expected that there would be minor impacts associated with implementation of the Proposed Action or the No Action Alternative. A summary of potential impacts and comparison to baseline conditions is presented in Table ES-1.

Description of Past and Reasonably Foreseeable Future Actions

The CEQ regulations stipulate that the cumulative effects analysis within a EA should consider the potential environmental impacts resulting from the incremental impacts of the action when

added to other past, present and reasonably foreseeable actions, regardless of what agency or person undertakes such other actions (40 CFR §1508.7). Cumulative effects most likely arise when a relationship exists between a Proposed Action and other actions expected to occur in a similar location or during a similar time period. Based upon the 2007 Installation Development EA, the 2008 General Plan, and Dover AFB staff, 67 past and reasonably foreseeable actions have been identified for evaluation concurrent with the Proposed Action. Of these, 2 actions include facilities construction within the Area of Potential Effect (APE) of the proposed FTU facilities development. No personnel would relocate to the Base under any of the actions nor would any of the actions include airfield operations. As such, the incremental contribution of impacts of the Proposed Action, when considered in combination with other past, present, and reasonably foreseeable actions, are not expected to have significant long-term negative impacts to any of the resource areas analyzed. Short-term, negative direct impacts to air, water and soil resources may occur during the construction of the additional administrative space.

Irreversible and Irretrievable Commitment of Resources

NEPA requires that environmental analysis include identification of any irreversible and irretrievable commitments of resources which would be involved in the Proposed Action should it be implemented. Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the use of these resources has on future generations. Irreversible effects primarily result from the use or destruction of a specific resource that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action. For the Proposed Action, no irreversible or irretrievable resource commitments would result.

Table ES-1. Summary of Potential Impacts

Resource	Proposed Action	No Action Alternative
Airspace Use/Management	Implementing the C-5M FTU beddown at Dover AFB would increase air operations approximately 8.9%. Under the Proposed Action, approximately 336 additional C-5M sorties are planned annually, resulting in about 1,350 additional annual flying hours. This corresponds to about 2 sorties a day on a Monday through Friday training-day schedule. One day sortie and a night sortie would fly within half-hour windows before sunrise and after sunset; this would minimize conflicts of aircraft with peak bird occurrence on the airfield. No substantially adverse effect on airspace management or use would occur since the Proposed Action would not: restrict movement of other air traffic in the area; create conflicts with air traffic control in the region; change operations within airspace already designated for other purposes; result in a need to designate controlled airspace where none previously existed; result in a reclassification of controlled airspace from a less restrictive to a more restrictive classification; or result in a need to designate regulatory special use airspace.	The baseline level of activity is presently lower than that which would occur under the Proposed Action. This baseline level of activity is also what would remain under the No Action Alternative.
Noise	No significant negative noise impact would occur either from construction of facilities required by beddown of the C-5M FTU or increased air operations. There would be a possibility of short-term, localized speech interference or annoyance near construction zones but this would be temporary, occur during the day, and cease upon completion, hence would not be substantially adverse. Existing Air Force and workplace safety regulations would protect the hearing of workers. A substantial reduction	No change to existing conditions would occur if the C-5M FTU was not bedded down at Dover AFB. Noise would still be reduced as a result of the installation of improved engines on all assigned C-5s, and would be less than the Proposed Action since there would be no increase in training flights.

Table ES-1. Summary of Potential Impacts (cont'd)

Resource	Proposed Action	No Action Alternative
Noise (cont'd)	in noise from aircraft operations would occur compared to baseline due to the upgrade of assigned C-5 aircraft with improved engines. This reduction would not be as considerable as the No Action Alternative due to the 8.9% increase in flying operations under the Proposed Action.	
Air Installation Compatible Use Zone (AICUZ) / Land Use	The increased flight operations of the C-5M FTU beddown would not change the existing flight paths over ground and air traffic control practices, procedures, and policies would remain the same, thus no change to the Clear Zones or Accident Potential Zones would occur that would alter the degree of land use compatibility or incompatibility. Although FTU flight operations would increase 25%, the predicted 65 "A-weighted" sound level in decibels (dB[A]) and above noise contours would be reduced in overall extent and size compared to baseline conditions due to the quieter C-5M engines. Under the Proposed Action, the acreage within the 65 dB(A) or greater contours would shrink from 17,623 to 4,082 acres. Incompatible land use would decrease from 834 baseline acres to 147 acres. Implementation of the Proposed Action would benefit land use compatibility in the vicinity of Dover AFB. Proposed C-5M FTU facilities would be consistent with existing Air Operations and Administrative Area designated use areas as identified in the 2008 Dover AFB General Plan.	If the C-5M FTU was not beddown at Dover AFB, the existing policies and procedures governing aircraft operations would not change, hence no change to the Clear or Accident Potential Zones designations would be warranted, and no change to the current degree of land use compatibility or incompatibility would occur. Because conversion to the quieter C-5M engine would occur independent of the FTU beddown, similar to the Proposed Action, the 65 dB(A) and above noise exposure contours would be reduced from the baseline. This change to the predicted noise exposure contour would beneficially change the land use compatibility, similar to the manner found under the Proposed Action, lowering incompatible land use from 834 to 127 acres With the reduction in the overall size and extent of the contour, formerly incompatible land uses would no longer lie within a noise contour having a value of greater than 65 dB(A) day/night average A-weighted sound level (DNL), and below that threshold, no particular land use recommendation with respect to noise from aircraft operations is made by the Department of Defense (DoD).

Table ES-1. Summary of Potential Impacts (cont'd)

Resource	Proposed Action	No Action Alternative
Air Quality	The effects from construction emissions would be temporary, fall off rapidly with distance from the proposed construction site, and would not result in any long-term impacts. Implementation of Best Management Practices (BMPs) such as watering exposed soils would minimize fugitive dust particulates. The Clean Air Act (CAA) General Conformity Applicability Analysis completed by AFCEE concludes that implementation of the Proposed Action would result in a substantial reduction in emissions from the existing condition baseline. This would be achieved despite the estimated 8.9% increase in air operations associated with the C-5M FTU; the reduction in emissions would be due primarily to the cleaner converted engines of the C-5M *Super Galaxy*. Emissions would remain below *de minimis* levels that would require a CAA conformity determination.	Implementing the No Action Alternative would not result in any changes to current air quality in the region. Emissions would continue to be generated by Dover AFB activities such as aircraft operations and other aircraft maintenance activities, as well as vehicle, boiler, generator, and fueling operations, and industrial processes. It is anticipated that emissions from these activities would continue at the levels generated under the baseline condition.
Water Quality	Temporary and localized adverse impacts to water quality may occur from earth disturbance associated with facility construction for the proposed C-5M FTU beddown. Runoff from the construction site could introduce sediments and other pollutant loading from disturbed soils into adjacent surface waters, however, this potential would be minimized by use of erosion control BMPs.	No change to existing conditions would occur if the C-5M FTU was not beddown at Dover AFB.
Soil Resources	Short-term, localized adverse impacts associated with ground disturbance may occur during construction activities. These impacts would be minimized through the use of erosion and sedimentation control measures and BMPs for heavy equipment use.	No change to existing conditions would occur if the C-5M FTU was not beddown at Dover AFB.

Table ES-1. Summary of Potential Impacts (cont'd)

Resource	Proposed Action	No Action Alternative
Hazardous Materials/Waste	Implementation of the Proposed Action could consume hazardous materials and/or generate hazardous wastes such as fuels, paints, glues, and asphalt materials. Beddown of the C-5M FTU would increase required aircraft maintenance and associated materials use such as fuel, oil, tires, and the like. These substances would be handled and disposed of as directed by Dover AFB management plans, resulting in no substantial adverse effects. Environmental Restoration Program Site ST05 is an old fuels storage area located in the vicinity of proposed facility construction. Facility development may disturb contaminated surface soils, which would be treated and disposed of in accordance with applicable Federal, state, and local regulations. The potential construction effects would be short-term, ending with completion of facility development.	Under the No Action Alternative, beddown of the C-5M FTU would not occur, hence no change to hazardous waste and materials baseline conditions would occur.
Socioeconomics / Environmental Justice	Slight beneficial effects to the local and state economy would occur from expenditures associated with the Proposed Action. There would be no adverse effects to demographics, income or employment from the Proposed Action, therefore no highly adverse disproportionate impacts to minority or low-income populations would occur. As the noise generated by the C-5M FTU would be less than existing baseline conditions, no highly adverse disproportionate impacts to minorities or low income populations would occur from increased flights associated with the FTU.	No change to existing conditions would occur if the C-5M FTU was not beddown at Dover AFB.
Safety	No substantial effect to risk exposure would occur from the Proposed Action. Although aircraft operations would increase by an estimated 8.9%,	No change to existing conditions would occur if the C-5M FTU was not beddown at Dover AFB. The FTU would beddown at some other

Table ES-1. Summary of Potential Impacts (cont'd)

Resource	Proposed Action	No Action Alternative
Safety (cont'd)	current airfield safety infrastructure and emergency response capacity are capable of dealing with the increase without severely increasing airfield safety risks. Construction activities would not increase bird habitat, yet, the increased flight operations could result in a slight increase in Bird/Wildlife Aircraft Strike Hazard (BASH) risk. The installation of new engines on assigned C-5 aircraft would reduce the risk of aircraft mishaps, including mishaps in the event of a BASH incident. No substantial negative effect to aviation safety is expected to occur from implementation of the Proposed Action.	installation, producing pilots and aircrew trained to safely operate the C-5M *Super Galaxy* aircraft.

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ACRONYMS AND ABBREVIATIONS

AC	Advisory Circular
ACS	American Community Survey
ADP	Area Development Plan
Air Force	United States Air Force
AFB	Air Force Base
AFCEE	Air Force Center for Engineering and the Environment
AFH	Air Force Handbook
AFI	Air Force Instruction
AFOSH	Air Force Occupational and Environmental Safety, Fire Protection, and Health
AFPD	Air Force Policy Directive
AFRC	Air Force Reserve Command
AGL	above ground level
AICUZ	Air Installation Compatible Use Zone
ALTRV	altitude reservations
AMC	Air Mobility Command
AMC/CV	Air Mobility Command/Vice Commander
AMXS	Aircraft Maintenance Squadron
APE	area of potential effect
APZ	accident potential zones
AQI	air quality index
A-R	aerial refueling
ARFF	Airport Rescue and Fire Fighting
ARTCC	air route traffic control centers
AS	Airlift Squadrons
ASV	annual service volume
ATC	Air Traffic Control
ATS	Aircrew Training System
AW	Airlift Wing
BASH	Bird/Wildlife Aircraft Strike Hazard
BEA	Bureau of Economic Analysis
BLS	Bureau of Labor Statistics
BMPs	best management practices
BRAC	Base Realignment and Closure
CAA	Clean Air Act
CATEX	categorical exclusion
CEQ	Council on Environmental Quality
CATE	computerized avionics test equipment
CERCLA	Compensation and Liability Act
CES/CEAN	Civil Engineering Squadron/Asset Management Flight
CES/CEP	Civil Engineering Squadron/Planning Group
CFR	Code of Federal Regulations
CO	carbon monoxide
COMSEC	communications security
CPT	Cockpit Procedural Trainer
CTK	consolidated tool kit

ACRONYMS AND ABBREVIATIONS (cont'd)

CWA	Clean Water Act
CY	calendar year
CZ	clear zone
dB	decibel
dB(A)	A-weighted sound level in decibels
DNL	day/night average A-weighted sound level
DNREC	Department of Natural Resources and Environmental Control
DoD	Department of Defense
DSWA	Delaware Solid Waste Authority
EA	environmental assessment
EIAP	Air Force environmental impact analysis process
EIS	environmental impact statement
EMS	emergency medical service
EO	Executive Order
EPCRA	Emergency Planning and Community Right-to-Know Act
EPR	engine pressure ratio
ERP	Environmental Restoration Program
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
FES	Fire Emergency Services
FICON	Federal Interagency Committee on Noise
FICUN	Federal Interagency Committee on Urban Noise
FONPA	finding of no practicable alternative
FONSI	finding of no significant impact
FSS	Force Support Squadron
FQ	fiscal quarter
Ft	feet
FTU	Formal Training Unit
FY	fiscal year
GPS	global positioning system
GSE	ground support equipment
HazMat	hazardous materials
HUD	United States Department of Housing and Urban Development
ICAO	International Civil Aviation Organization
IDEA	Installation Development Environmental Assessment
IFR	instrument flight rules
IMC	instrument meteorological conditions
IR	instrument route
LBS	pounds of fuel flow per hour
L_{dn}	day/night average A-weighted sound level
L_{eq}	equivalent sound level
L_{max}	the maximum sound level
LOS	level of service
LTO	landing and take off

ACRONYMS AND ABBREVIATIONS (cont'd)

LUC	land use controls
MDS	mission design series
MILCON	Military Construction
MIL-STD	Military Standards
MOA	military operating area
MSDS	material safety data sheet
MTF	Maintenance Training Facility
MTR	military training route
MSL	mean sea level
NA	not applicable
NAAQS	National Ambient Air Quality Standards
NAF	non-appropriated funds
NAS	National Airspace System
ND	no date
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association
NHPA	National Historic Preservation Act
NLR	noise level reduction
NM	nautical mile
NPDES	National Pollutant Discharge and Elimination System
NO_x	nitrous oxides
NOI	notice of intent
NRCS	Natural Resources Conservation Service
O_3	ozone
O&M	operations and maintenance
OSHA	Occupational Safety and Health Administration
Pb	lead
PCE	tetrachloroethylene
PM_{10}	particulate matter measuring less than 10 microns in diameter
PPM	parts per million
RA	restricted area
RAPCON	Radar Approach Control
RCRA	Resource Conservation and Recovery Act
RI	remedial investigation
ROI	region of influence
SARA	Superfund Amendments and Reauthorization Act
SATAF	Site Activation Task Force
SEL	sound exposure level
SGCN	species of greatest conservation need
SIP	State Implementation Plan
SM	statute mile
SO_2	sulfur dioxide
SPL	sound pressure level
Sq Ft	square feet
SR 1	State Route 1

ACRONYMS AND ABBREVIATIONS (cont'd)

SUA	Special Use Airspace
SVFR	special visual flight rules
TCE	trichloroethylene
TCLP	Toxicity Characteristic Leaching Procedure
TDY	temporary duty
TGO	touch and go
TRACON	Terminal Radar Control
TWCF	Transportation Working Capital Fund
UFC	Unified Facilities Criteria
USACE	United States Army Corps of Engineers
USC	United States Code
USCB	United States Census Bureau
USEPA	United States Environmental Protection Agency
UST	underground storage tank
VFR	visual flight rule
VOC	volatile organic compounds
VR	visual route
WST	Weapons System Trainer
$\mu g/m^3$	micrograms per cubic meter

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1.0 PURPOSE AND NEED FOR THE ACTION

1.1 Introduction and Background

The United States Air Force (Air Force) Air Mobility Command/Vice Commander (AMC/CV) has directed that Dover Air Force Base (AFB) evaluate through the Environmental Impact Analysis Process (EIAP) a proposed beddown of a Formal Training Unit (FTU). Specifically, the FTU would provide training to aircrews transitioning to C-5M *Super Galaxy* aircraft that have been modified to use quieter, more fuel efficient engines, and whose avionics have been upgraded. This EIAP analysis is required prior to initiating implementation of the action. Beddown of the proposed FTU would include facility development, additional training flights, and classroom training for pilots and flight crew.

The assessment of the potential environmental impacts of the Proposed Action is administered by the Air Force Center for Engineering and the Environment (AFCEE), Air Mobility Command (AMC), and the 436 Airlift Wing (AW) Mission Support Group, Civil Engineering Squadron, Asset Management Flight (CES/CEAN) at Dover AFB.

Congress approved funding to modify the existing fleet of 52 C-5B/C *Galaxy* aircraft of which Dover AFB is scheduled to receive 18. Over 70 improvements to the aircraft are being made under the Avionics Modernization Program and the Reliability Enhancement and Re-engining Program, extending the life of the C-5 fleet another 30 years, and realizing billions of dollars in savings in operation and sustainment costs (Hafer 2009). The improved aircraft are now known as the *Super Galaxy*; predecessor C-5 aircraft are referred to as the C-5 *Galaxy*.

Since its beginning in 1941, Dover AFB has expanded its airlift mission capabilities to include the C-5 *Galaxy* and C-17 *Globemaster* III air wings. Dover AFB, situated in Kent County, Delaware (Figure 1-1), hosts the 436 AW. As host unit, the 436 AW provides command and control, and associated support functions to airmen and aircraft conducting a global airlift mission. Aircraft and aircrews assigned to Dover AFB provide worldwide movement of cargo and personnel on time-sensitive airlift missions. The aircraft assigned to Dover AFB comprise approximately 25% of the airlift capability of the Air Force (Dover AFB No Date [ND]a).

Dover AFB is the largest and busiest aerial port in the Department of Defense (DoD) and is home to the only joint services mortuary on the East Coast. The base employs approximately 6,600 civilian and military personnel, contributing an estimated economic impact greater than

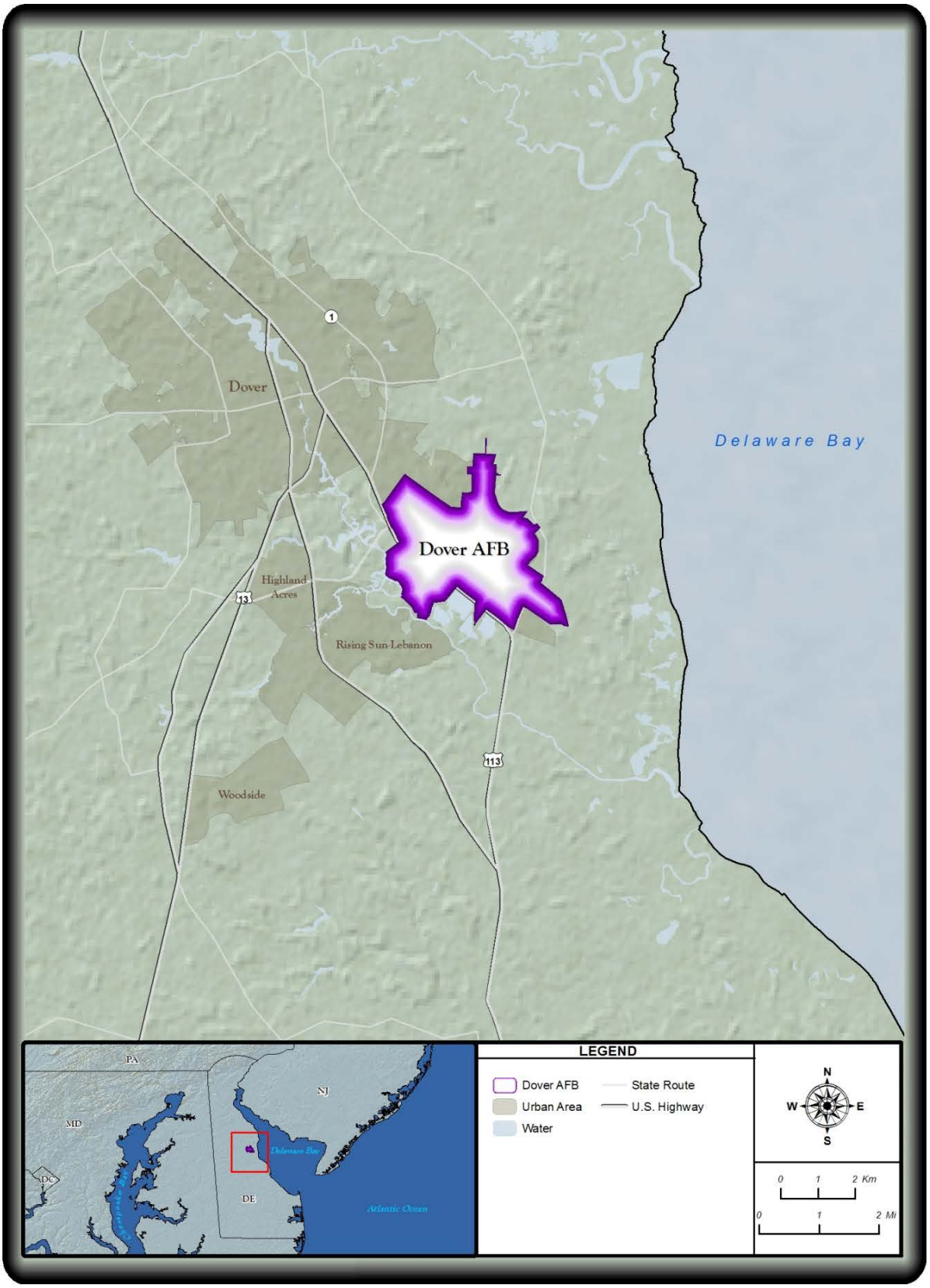

Figure 1-1. General Vicinity Map of Dover AFB

$470 million annually on the Delaware economy (Dover AFB NDb), and is considered Delaware's third largest industry (City of Dover 2009).

1.2 Purpose and Need for the Proposed Action

The primary purpose of the Proposed Action is to fulfill the Air Force and 436 AW mission of providing strategic airlift of U.S. forces when needed around the globe, and humanitarian airlift in times of natural disasters (Dover AFB NDc). In order to extend the life cycle of the C-5 program to meet that mission, Congress approved modifications to 52 of the C-5 *Galaxy*, which have been upgraded with over 70 improvements addressing avionics, fuel consumption, noise, and reliability deficiencies of the aging aircraft. The improved C-5M *Super Galaxy* aircraft have different handling properties and maintenance requirements for which personnel need to be trained for their use and maintenance. The need of the Proposed Action is therefore to provide training the purpose of which is furthering the airlift mission of the 436 AW.

The AMC/CV has directed the beddown for the C-5M FTU at Dover AFB, pending EIAP analysis, to achieve Initial Operability by Fiscal Quarter (FQ) 2/2012 and full training production of approximately 106 pilots and 46 flight engineers per year by FQ 1/2016.

1.3 Scope of This Environmental Assessment

This Environmental Assessment (EA) was prepared in accordance with the National Environmental Policy Act (NEPA) (Public Law 91-190, 42 United States Code [USC] §4321 et seq.), Department of the Air Force Regulation, Environmental Impact Analysis Process (32 Code of Federal Regulations [CFR] §989), and the Council on Environmental Quality (CEQ) implementing regulations (40 CFR §§1500-1508). A variety of laws, regulations, and Executive Orders (EO) apply to actions undertaken by Federal agencies. These form the basis of the analyses which will be presented in the EA. These include but are not limited to:

- Endangered Species Act (ESA);
- National Historic Preservation Act (NHPA);
- Clean Air Act (CAA);
- Clean Water Act (CWA);
- EO 11514, Protection and Enhancement of Environmental Quality;

- EO 12898, Federal Actions to Address Environmental Justice in Minority Populations; and Low-Income Populations; and
- EO 11990, Protection of Wetlands.

NEPA became law in 1970; its purpose is to ensure careful consideration of environmental aspects of proposed actions as part of the Federal decision-making processes. To achieve that careful consideration, it requires that environmental information be available to decision-makers and the public prior to decisions being taken and actions implemented. It establishes a process for consideration of the potential effects arising from a Federal action by requiring that detailed analysis and public disclosure of potential effects occur prior to the undertaking of actions with the potential to have a significant effect on the environment. In accordance with CEQ guidance (40 CFR §1508.9), when it is not immediately clear whether a Proposed Action may have significant impacts as defined by NEPA, an EA is prepared to briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement (EIS) or a finding of no significant impact (FONSI).

The decision to be made by the Air Force, after a review of the analysis presented in this EA, would be whether or not to issue a FONSI and, if applicable, a finding of no practicable alternative (FONPA) for actions potentially affecting wetlands. If a FONSI/FONPA cannot be supported by the analysis, the decision would then turn to whether or not to proceed with development of an EIS to further quantify and detail the significant impacts resulting from potential implementation of the Proposed Action or alternatives. While this EA provides information with which to make better decisions regarding the Proposed Action, its preparation does not imply project approval or authorization.

1.4 Organization of This Environmental Assessment

This EA follows the format established in 32 CFR §989, the Air Force guidelines for implementing the CEQ regulations (40 CFR §1502). Section 1 presents the purpose and need for the action. The alternatives to the Proposed Action, including no action, are presented in §2. The affected environment and environmental consequences are presented in §§3 and 4, respectively. The cumulative affects analysis is contained in §5, and mitigation measures is found in §6. A list of the document preparers and contributors is presented in §7. The persons and agencies contacted in the preparation of this EA, and description of making this EA available

for public comment are provided in §8. The references used in preparation of this EA are presented in §9. The appendices provide supporting documents used in preparation of this EA.

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2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

This section of the EA describes the Proposed Action and alternatives to the Proposed Action, including a No Action Alternative, that are analyzed in this EA. Alternatives carried forward for analysis in this EA were identified as meeting the underlying purpose and need for the action, and comply with applicable Federal and state law. The No Action Alternative is carried forward for analysis as a baseline against which all other alternatives are compared in accordance with NEPA (40 CFR §1502.14(d)). This section concludes with a comparative summary of the Proposed Action and alternatives.

2.1 Identification of Selection Criteria

In an effort to satisfy the purpose and need for the Proposed Action, several selection criteria were developed to compare and contrast alternative ways of fulfilling the objectives of the Proposed Action in accordance with 32 CFR §989.8(c). Those specific criteria include:

1. **Conformance (generally) with the Dover AFB General Plan adopted in 2008.** The development of administrative and flight training facilities associated with the beddown of the C-5M FTU must not conflict with long-range plans for base development and should further the installation's development plans by focusing future construction and land use changes into compatible areas. The goals and strategies for developing the installation (including re-capitalizing existing infrastructure) are set forth in the *Dover AFB General Plan (*Dover AFB 2008); its principal strategy is to maximize functional relationships, and provide for efficient use of buildings, real estate, and existing infrastructure (*Ibid.*).

   In particular, the General Plan identifies a series of development constraints (composite constraints) on new and in-fill development. Constraints such as airfield safety, munitions storage safety, noise compatibility, presence or absence of ground contamination, cultural resources or sensitive habitat are mapped in an aggregate fashion to depict where on the installation development of a certain-sized parcel of land would be feasible.

2. **Site aircrew training facility within walking distance of simulator. The Cockpit Procedural Trainer (CPT) simulator is previously installed in Building 206.**

3. **Site flight-line training facilities within walking distance of Aircrew Training Facility (ATS) facility.**
4. **Find a site of sufficient size to accommodate approximately 8,275 square feet of constructed administrative/training space and associated off-street parking.**
5. **Find a location with access to existing, adequately sized utilities to minimize land disturbance and expense.**
6. **Minimize potential adverse environmental effects through avoidance, design, and mitigation**. To the greatest extent feasible, the construction of facilities associated with the beddown of the C-5M FTU should minimize adverse environmental effects. If such effects would be unavoidable, minimization measures would be implemented such as:
    - altered design that is functional, financially reasonable, and meets safety criteria;
    - employment of best management practices (BMPs) that lessen effects; and/or
    - mitigation of effects that does not result in irreversible or irretrievable commitment of resources.

    In general, sites with historic properties, sensitive habitats for protected species, and wetlands should be avoided.

2.2 Alternatives Considered but Eliminated From Further Analysis

CEQ regulations at §1502.14(a) require that agencies rigorously explore and objectively evaluate all reasonable alternatives and, for alternatives eliminated from detailed study, briefly explain the reasons for their elimination. Alternate locations for the siting of the C-5M FTU training facilities have been considered, but only the Proposed Action addressed all site selection criteria described in §2.1, and thus was feasible given composite environmental and operational constraints as identified in the 2008 General Plan (Dover AFB 2008). Alternative locations were therefore eliminated from further detailed analysis.

2.3 Description of the Proposed Action

The Proposed Action would be to establish, operate, and maintain the C-5M FTU at Dover AFB. The FTU would be comprised of approximately 5 Instructor Pilots and 5 Instructor Flight Engineers who would train approximately 106 pilots and 46 flight engineers annually (24

students at a time), and would involve the use of 2 Weapon System Trainers (WST) and a CPT. Other associated FTU components include:

- administrative/classroom facilities
- student housing
- transportation to the training facilities and airfield
- flight operations

2.3.1 Administrative/Classroom Facilities Construction

The Proposed Action provides for phased implementation of the beddown both in terms of facility development and number of personnel trained. FTU operations would be scheduled to initiate in FQ 2/2012 with an operational WST by FQ 2/2012 and an additional WST by FQ 4/2012. Facility requirements of the FTU as established by all applicable Unified Facility Criteria indicate the need for approximately 8,275 square feet of constructed space.

The facilities used by FTU personnel would consist primarily of the ATS, a contractor-operated flight simulator training section, and the flight-line aircraft training section. These facilities are proposed to be constructed in the area of potential effects (APE) as depicted in Figure 2-1. The ATS section preliminarily requires approximately 3,525 square feet of instructor offices, computer-based training rooms, scheduler/registrar, publication/storage area, and instructor review rooms (Air Mobility Command 2010a). All but 1,250 square feet needed for instructor offices could be accommodated in the rehabilitated Building 206. The Active Duty Flight-line training facility as currently planned would require about 4,750 square feet of instructor offices, classrooms, a break room/computer room, a conference room, and storage area and would be obtained through a Fiscal Year (FY) 2012 military construction (MILCON) addition to Building 206. The additional 1,250 square feet of instructor offices for the ATS would also be included, for a total of 6,000 square feet for this MILCON project.

Construction of these facilities would be phased, with about 3,000 square feet of administrative space to be provided by use of temporary trailers by October 2012, followed by modifications to existing buildings, and potentially new construction, all of which would be completed by FQ4/2013 (Air Mobility Command 2010b; S. Seip, personal communication, November 15, 2010). In the event that MILCON slips to FY 2013, additional trailer space may be required.

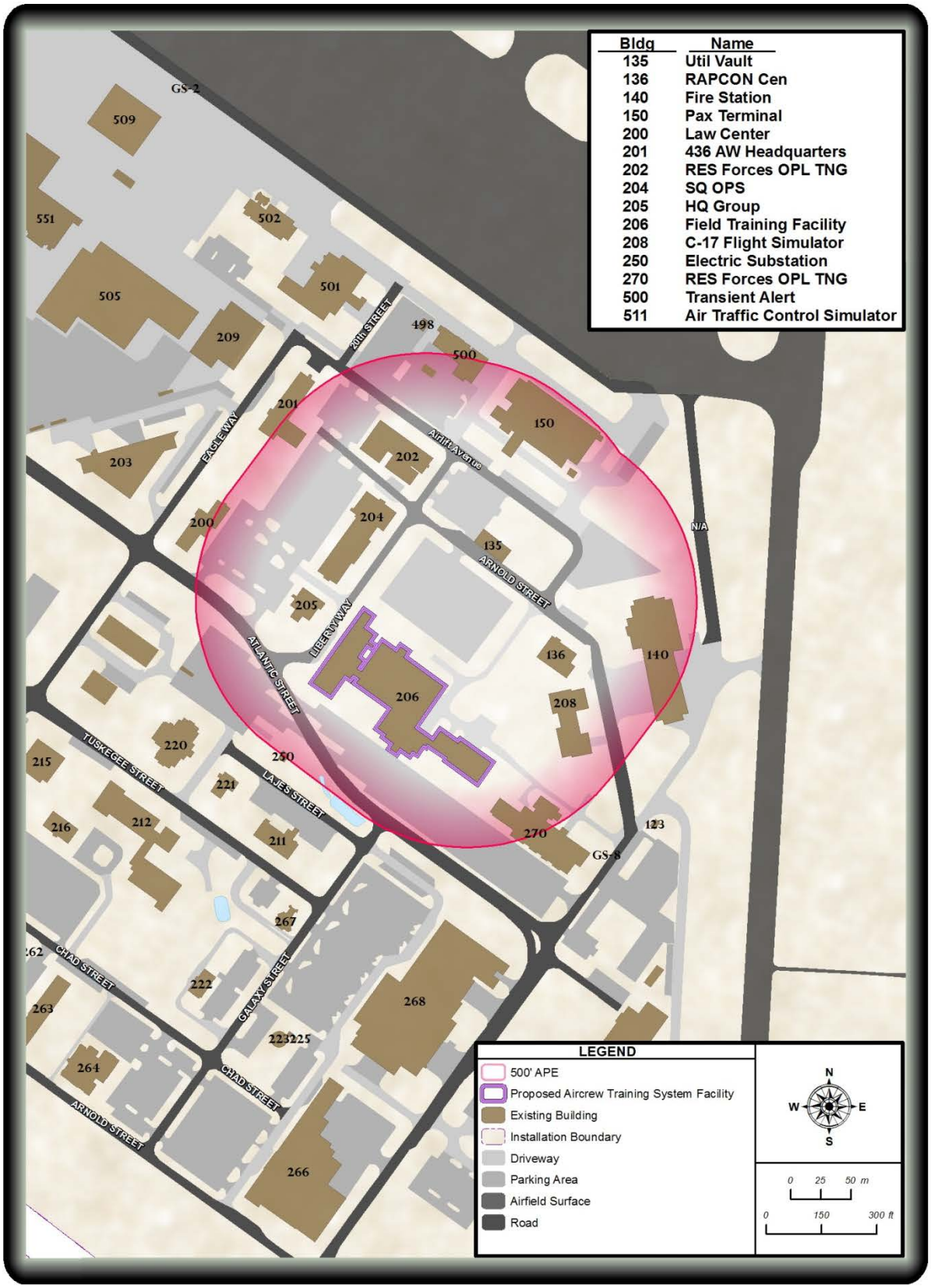

Figure 2-1. Dover C-5M FTU Proposed Action Training Facility Location Site Map

The proposed location for the administrative/classroom facilities is in an area bounded on the west-northwest by Liberty Way, on the north by Airlift Avenue, on the east by Purple Heart Drive, and the south by Atlantic Street (see Figure 2-1). This area lies west-southwest of the airfield. The exact configuration of renovated buildings, temporary trailers, and new building construction is yet to be determined. For purposes of this analysis, the APE from construction and operation of the administrative/training facilities associated with the FTU is assumed to occur within 500 feet of the parking lot shown in Figure 2-1. Preliminary plans include installation of three temporary office trailers by October 2012 on the southern edge of the parking lot, adjacent to the west-northwest edge of the ATS Facility planned for Building 206, and west-southwest of Building 136.

Building 206 is currently occupied by the ATS Learning Center and also houses the CPT simulator. Further proposed modifications of Building 206 would include combining existing rooms requiring completion by January 2012. If military construction funding occurs as requested, new construction of the remaining space needed for administrative/training facilities for the C-5M FTU would be completed; however, if such funding is not obtained, additional temporary trailers would be installed on the site (Air Mobility Command 2010b). No new offsite utility construction would be required as existing utilities are of sufficient capacity to accommodate these facilities. Total estimated cost of the facility development component of the C-5M FTU beddown is $3.2 million (S. Seip, personal communication, November 15, 2010).

2.3.2 Student Housing

As part of a feasibility study prepared by AMC, the existing quantity of transient lodging on and off the installation was examined. During the detailed site surveys undertaken by the Site Activation Task Force (SATAF) in June 2010, the team consulted with the 436 Force Support Squadron (FSS) to determine the sufficiency of billeting capacity. Given the projected syllabus duration and student throughput, it was determined that existing facilities were adequate both in terms of quantity of rooms as well as the suitability of the accommodations in a manner commensurate with the anticipated grades of the student pilots. The applicable Air Force Instructions (AFI) indicate that lodging is assigned on a first-come basis and rooms may be set aside as soon as a training schedule is published and the lodging demand is ascertained. Approximately 15 rooms would be set aside as far in advance as is feasible and particular

occupants would be identified 10 days prior to occupancy. Accordingly, no additional lodging facility construction is required or proposed as part of the FTU beddown.

2.3.3 Transportation

Students would utilize rental cars or personally owned vehicles to access the administrative/training facilities. Transportation from the training facilities to the parked aircraft would rely upon existing infrastructure; the estimated increase in vehicular traffic between the training facilities and the parked aircraft would consist of 6 trips per day (1 each way for 2 flights; 1 each way from the ground trainer) utilizing 2 15-passenger vehicles (Air Mobility Command 2010b).

2.3.4 Airfield Construction

Use of training aircraft would not require any new Dover AFB airfield construction as the existing complex of runways, taxiways, ramp/apron aircraft parking, along with existing navigation, communications, and airfield lighting are adequate to support the proposed beddown and increased flight activity. A planned, new hangar may be utilized and a mobile tail enclosure hangar may be acquired (Air Mobility Command 2010b), Training flights would increase required maintenance of the C-5M *Super Galaxy* aircraft, consuming more fuel, oil, and other related products.

2.3.5 Flying Operations

No additional aircraft are proposed to be stationed at Dover AFB as part of the Proposed Action. Table 2-1 presents the aircraft inventory that currently exists and that would continue as a result of implementing the Proposed Action.

While the number of aircraft stationed at Dover AFB would not change, the utilization of the C-5 stationed there would increase under the Proposed Action. In discussing flying operations at an airfield, it is helpful to define the following terms:

- Sortie: A sortie is defined as a single military aircraft flight from initial takeoff through termination landing.
- Aircraft Operation: An aircraft operation is defined as one takeoff/departure, one approach/landing, or half of a closed pattern.

Table 2-1. Aircraft Counts

Aircraft Type	FY 2009 Baseline	Additional Aircraft/ Percent Increase	Proposed Action End State
C-5M	4	0.00%	18
C-5	14	0.00%	0
C-17	13	0.00%	13
TOTAL	31	0.00%	31

Notes: FY= Fiscal Year

- Closed Pattern: A closed pattern consists of two operations, a takeoff/departure and an approach/landing.

One sortie will always consists of at least 2 aircraft operations: a takeoff/departure and an approach/landing (which may occur elsewhere). A sortie often includes more operations in the form of closed patterns for proficiency training. Each phase of flight follows a generally predetermined flight path.

Under the Proposed Action, approximately 336 additional C-5M sorties are planned annually, resulting in approximately 1,350 additional annual flying hours. This corresponds to about 2 sorties a day on a Monday through Friday training-day schedule. A day sortie and a night sortie would fly, within half-hour windows before sunrise and after sunset, to minimize conflicts of aircraft with peak bird occurrence on the airfield.

Flying operations, the sum of all departures, arrivals and closed pattern activity, typically fluctuate somewhat from year to year; however, in general they would increase up to 8.9% under the Proposed Action. The baseline level of activity is presently lower than that which would occur under the Proposed Action. This baseline level of activity is also what would remain under the No Action Alternative.

At present, approximately 35,500 annual aircraft operations occur at Dover AFB. In addition to the C-5B/C and C-5M aircraft stationed at Dover AFB, other aircraft based there include the C-17 *Globemaster* and a variety of single and twin-engine, general aviation aircraft belonging to the Aero Club operated by the 436 FSS. Additionally, a wide variety of transient aircraft use

Dover AFB over the course of a given year, including heavy cargo military and civilian jet aircraft, along with bombers, and fighters from other Air Force Bases.

Table 2-2 presents the increase in flying operations that would result from the implementation of the Proposed Action.

2.3.6 Permits and Notifications

Prior to initiation of construction activities, plans and documents for site clearing and preparation as well as construction of the facilities would be prepared. As part of development of engineered drawings and specifications, environmental controls would be integrated into the plans. These plans and specifications would be submitted to the government project team and the contracting officer at Dover AFB for review and approval.

Environmental controls for the Proposed Action would be designed to control erosion and sedimentation, manage and treat contaminated soil, and control stormwater runoff. All construction debris would be recycled or disposed of at an approved landfill in accordance with all applicable Federal, state, and local laws and regulations.

To reduce impacts to local and regional air quality, BMPs such as proper maintenance of construction vehicles to reduce combustive emissions, limiting the size of the disturbance area, and watering exposed soils at the beginning and end of daily construction activities, would be implemented to minimize or prevent fugitive dust emissions.

U.S. Environmental Protection Agency (USEPA) administers the National Pollutant Discharge Elimination System (NPDES) applicable to construction sites greater than 1 acre and disturbance greater than 5,000 square feet requires a Sediment and Stormwater Management Plan. Dover AFB administers the requirements for applicable projects on the installation, and construction contractors acquire individual permits from USEPA. A Sediment and Stormwater Management Plan would require a design report, all pertinent information from the Sediment and Stormwater Management Plan Checklist, and a completed Plan Checklist. The Erosion and Sediment Control portion of the Plan must include BMPs to reduce or eliminate the potential for erosion and sediment deposition from the construction activities. Additionally, in accordance with the Sediment and Stormwater Management guidelines, post-construction BMPs would be implemented and maintained. USEPA has ultimate authority to enforce NPDES permits.

Table 2-2. Aircraft Operations

Aircraft Type	FY 2009 Baseline Action			Proposed Action			Percent Increase in Average Daily Operations	No Action			Percent Increase in Average Daily Operations
	Annual Sorties	Average Annual Operations[1]	Average Daily Operations[2]	Annual Sorties	Average Annual Operations	Average Daily Operations		Annual Sorties	Average Annual Operations	Average Daily Operations	
Base Assigned Aircraft											
C-5A/B	522	12,701	48.66	0	0	0	0%	0	0	0	0%
C-5M[3]	0	0	0	626	15,876	60.83	25%	522	12,701	48.66	0%
C-17	570	10,431	36.60	570	10,431	36.60	0%	570	10,431	36.60	0%
Aero Club	1,800	5,161	14.14	1,800	5,161	14.14	0%	1,800	5,161	14.14	0%
Transient Aircraft											
C-5	3	3	0.008	3	3	0.008	0%	3	3	0.008	0%
All Others	7,204	7,204	19.74	7,204	7,204	19.58	0%	7,204	7,204	19.58	0%
TOTAL	10,099	35,500	119.14	10,203	38,675	131.15	8.9%	10,099	35,500	119.4	0%

[1]Based upon historical flying operations at Dover AFB, the following aircraft operations per sortie factors were used for based aircraft; C-5 (2.31 operations/sorties); C-17 (18.3 operations/sorties); Aero Club (2.87 operations/sorties).
[2]Average Daily Operations equals the Average Annual Operations divided by the flying days per year which are: 261 days per year (C-5); 285 days per year (C-17); 365 days per year (Aero Club).
[3]C-5A/B Mission Design Series (MDS) convert to C-5M MDS under the Proposed Action and No Action as system upgrades are completed.

2.4 Alternatives to the Proposed Action

2.4.1 No Action Alternative

Although it would not satisfy the purpose and need for the action, a No Action Alternative has been carried forward as the baseline against which potential impacts arising from action alternatives can be measured. The No Action Alternative is carried forward for analysis in accordance with CEQ regulations (§1502.14 (d)). Under the No Action Alternative beddown of the C-5M *Super Galaxy* FTU at Dover AFB would not occur.

2.5 Alternatives Considered but Eliminated From Further Analysis

CEQ regulations at §1502.14(a) require that agencies rigorously explore and objectively evaluate all reasonable alternatives and, for alternatives eliminated from detailed study, briefly explain the reasons for their elimination. Alternate locations for the siting of the C-5M FTU training facilities have been considered, but for the following reasons, been determined infeasible and/or did not meet purpose and need. As discussed in §2.1 Selection Criteria, general conformance to the Dover AFB General Plan goals and known composite constraints as identified in that plan, coupled with the need for siting the ATS Facility near the CPT Simulator and the Flight-line Facility within walking distance of the ATS Facility have limited potential locations for beddown of the FTU to the vicinity of Building 206 (see Figure 2-1).

2.6 Comparison of the Alternatives

Table 2-3 provides a summary comparison of the alternatives as they relate to the purpose and need minimal criteria presented in §2.1. This table indicates that only the Proposed Action would meet the established purpose and need for the beddown of the C-5M FTU beddown action. Table 2-4 provides a quantitative summary of the proposed activities of the alternatives carried forward for detailed analysis. Table 2-5 summarizes the potential effects of the alternatives carried forward for detailed analysis on initial pertinent environmental resources.

Table 2-3. Summary Comparison of Alternatives to Implement the Proposed Action

Purpose and Need Criteria	Alternatives	
	Proposed Action	**No Action**
Comply with Dover AFB General Plan	Yes	No
ATS Facility near CPT simulator	Yes	No
Flight-line Facility walking distance access to ATS Facility	Yes	No
Find a location with space for approximately 8,275 sq ft of space and associated infrastructure	Yes	No
Find a location with access to current utilities	Yes	No
Minimizes adverse environmental impacts	Yes	NA

Notes: Dover AFB = Dover Air Force Base; ATS = Aircrew Training System; CPT= Cockpit Procedural Trainer; sq ft = square feet; NA= not applicable.

Table 2-4. Quantitative Summary of the Proposed Activities

Activity	Proposed Action	No Action Alternative
Personnel Added	5 Pilot Instructors 5 Flight Engineer Instructors 106 Student Pilots Per Year 46 Flight Engineers Per Year	0
Facility Construction : • Temporary Trailers • ATS Facility Rehabilitated Building 206 space • ATS Facility New Construction • Flight-line (Aircraft) Training Facility New Construction	 2-3 150 sq ft trailers 2,275 sq ft 1,250 sq ft 4,750 sq ft	0
Additional Airfield Construction	0	0
Student Housing Construction	0	0
Student Transportation	2 – 15 passenger vehicles, 6 trips per day	0
Airspace Operations: • Additional Sorties • Additional Flying Hours • Flying Operations Increase	 336 1,350 8.9%	 No Change No Change No Change
Additional Required Permits	NPDES permit for disturbance >5,000 sq ft	0
Estimated FTU Beddown Facilities Cost	$3,200,000	0
Meets Selection Criteria	Yes	No

Notes: ATS = Aircrew Training System; FTU – Formal Training Unit; NPDES = National Pollutant Discharge Elimination System permit; > = greater than; sq ft = square feet

Table 2-5. Alternatives' Potential Effects Comparison Matrix Summary – All Resources

Environmental Attributes	Proposed Action				No Action				Threshold Criteria
	+	0	-	U	+	0	-	U	
Airspace Use and Management				X		X			Impacts movement of other air traffic in the area or conflicts with air traffic control in the region. Changes operations within airspace already designated for other purposes or results in a need to designate controlled airspace where none previously existed. Requires a reclassification of controlled airspace from a less restrictive to a more restrictive classification. Results in a need to designate regulatory special use airspace.
Noise				X		X			Affects the noise levels established by Federal, state, and local regulations.
AICUZ/Land Use				X		X			Consistent with existing land use plans and policies, human life and property protection planning criteria, and adjacent land uses (current and planned).
Air Quality				X		X			Violates national or state standards, delays SIP standard or milestone attainments, or increases the number of *de minimis* standards expected.
Water Quality				X		X			Impacts water quality standards or unique hydrologic conditions, or established laws or regulations.
Soils				X		X			Changes erosion rates, creates a geologic hazard, or impacts unique soil/geologic condition.
Hazardous Materials and Waste				X		X			Violates applicable Federal, state, or local laws and regulations; impacts hazardous materials and waste generation or exposure beyond Dover AFB management capacity; or disturbs or creates hazardous material sites adversely affecting human health and the environment.

Notes: + = positive effect; 0 = no effect; - = negative effect; U = unknown effect; AICUZ = Air Installation Compatible Use Zone; SIP = State Implementation Plan

Table 2-5. Alternatives' Potential Effects Comparison Matrix Summary – All Resources (cont'd)

Environmental Attributes	Proposed Action				No Action				Threshold Criteria
	+	0	-	U	+	0	-	U	
Socioeconomic Resources and Environmental Justice				X		X			Affects employment, demographic trends, and business sectors. Impacts minority and low income populations.
Housing		X							Impacts the availability of adequate housing.
Safety		X				X			Creates unacceptable safety conditions, impacts potential exposure to hazardous materials/wastes/substances or emergency response capability. Substantially changes safety or health risks beyond existing management or response plans.
Cultural Resources		X				X			Impacts historic properties determined to meet the National Register of Historic Places criteria of eligibility.
Biological Resources		X				X			Impacts vegetation, wildlife, and protected species that may be found within the proposed project area.
Transportation		X				X			Affects the function or operational capacity of the roadway systems on and surrounding Dover AFB.

Notes: + = positive effect, 0 = no effect, - = negative effect, U = unknown effect

2.7 Resource Areas Addressed in Detail

Resource areas that potentially would be affected by the Proposed Action or No Action Alternative have been selected to allow for a comprehensive analysis of potential impacts. Table 2-5 summarizes the potential impacts of the alternatives carried forward for detailed analysis on initially considered biological and cultural resources as well as airspace use and management, noise, land use, safety, transportation, hazardous materials and waste, and socioeconomic resources. The intent of this EA is to meet the NEPA requirements established in the Air Force's 32 CFR §989 and the EIAP. The following resource areas have unknown impacts requiring evaluation and are discussed in detail in the EA:

- Airspace Use and Management
- Noise
- Air Installation Compatible Use Zone/Land Use; Air Quality
- Water Quality
- Soils
- Hazardous Materials and Wastes
- Socioeconomic Resources and Environmental Justice
- Safety

The existing condition of the above resources will be discussed in §3 and forms the basis for comparison of the effects of the alternatives analyzed in detail in §4.

2.8 Resources Eliminated from Detailed Analysis

CEQ regulations (40 CFR §1501.7) state that the lead agency shall identify and eliminate from detailed study the issues which are not important or which have been covered by prior environmental review, narrowing the discussion of these issues in the document to a brief presentation of why they would not have a dramatic effect on the human environment. Table 2-5 identifies those resources which would not be potentially affected by the alternatives selected for detailed analysis in this EA. In accordance with §1501.7, issues eliminated from detailed study include: cultural and biological resources, wetlands, coastal zone management, housing, and transportation.

2.8.1 Cultural Resources

The NHPA of 1966 (16 USC 470 et seq., as amended), the Archeological and Historic Preservation Act of 1974 (16 USC 469a et seq.), and the Archeological Resources Protection Act

of 1979 (16 USC 470aa-470ll) are designed to take into account potential impacts to historic properties in carrying out Federal activities and programs. Historic properties are at least 50 years old before present and include sites, buildings, structures, objects, and landscapes, as well as traditional cultural properties (places of importance to a culture or community) that have been determined to meet the National Register of Historic Places criteria of eligibility as specified in 36 CFR §60.4. According to Dover AFB cultural resource surveys (Dover AFB 2005a), no previously identified historic properties are in the area of potential effects of the C-5M FTU beddown, and the likelihood of their discovery is minimal. The proposed beddown undertaking would occur in areas previously disturbed in their entirety by recent development, including only structures built out of period. Therefore, cultural resources have been eliminated from detailed analysis in this EA.

2.8.2 Biological Resources

Biological resources typically evaluated in EAs include vegetation, wildlife, and protected species. For an action involving aircraft operations, analysis of potential effects would span beyond the installation boundary, in addition to those effects anticipated to occur on installation resulting from disturbances generated by construction activities. Within the base boundary, Dover AFB is an intensely developed installation in an urbanized setting, offering little habitat to support wildlife. The vegetative setting of those areas proposed for the C-5M facilities needed for the beddown of the FTU consists of maintained and regularly mowed grasses that would not be expected to support a diversity of wildlife species. According to the 2001 Integrated Natural Resources Management Plan, there are no known occurrences of Federally listed threatened or endangered animal or plant species at Dover AFB (Dover AFB 2001). The Department of Natural Resources and Environmental Control (DNREC) has determined that Federal protected species or suitable habitats do not exist within the boundaries of the base (Appendix A). Delaware Code (7 Del. Code § 601) specifies that the Division of Fish and Wildlife shall designate those fish and wildlife species seriously threatened with extinction. Three state-endangered species have been identified on Dover AFB and include upland sandpiper (*Bartramia longicauda*), northern harrier (*Circus cyaneus*) and short-eared owl (*Asio flammeus*), with only the breeding populations of the latter 2 species listed (Dover AFB 2007). Moreover, there are 14 species listed as Species of Greatest Conservation Need (SGCN) in the Delaware

Wildlife Action Plan that have been identified on Dover AFB (*Ibid.*). Of these, 6 are Tier 1 species, those in the most need of conservation action in order to sustain or restore their populations. Three of these species are the state endangered species listed above, the remaining are the American redstart (*Setophaga ruticilla*), broad-winged hawk (*Buteo platypterus*), and mud sunfish (*Acantharcus pomotis*).

The C-5M is a cargo aircraft that, except for takeoff and landings, generally operates at high altitudes exceeding 30,000 feet above Mean Sea Level (MSL). There are no known effects from either high-altitude or low-level aircraft overflight on vegetative communities. Generally, potential impacts to wildlife from operation of aircraft would include direct physical conflict, and would principally arise from noise or visual disturbance. Direct conflict of aircraft with wildlife occurs most frequently during take-offs, landings, and low altitude maneuvering. With little natural habitat to support a diversity of wildlife and no Federally protected species present on the installation, the principal consideration centers on Bird/Wildlife Aircraft Strike Hazard (BASH) management at Dover AFB. This issue is assessed in §3 (Affected Environment - Safety) and §4 (Environmental Consequences – Safety) of this document. The analysis indicates that incidents are infrequent at Dover AFB. Implementation of the Proposed Action would increase operations of based C-5 aircraft by approximately 25%, which would be unlikely to impact wildlife on a population level. The extent to which that increased exposure to risk has potential to adversely affect air operations and safety is described in §4 (Environmental Consequences – Safety).

Previous studies have generally concluded there is minimal to no effect on most wildlife from off-installation aircraft-related noise and visual disturbances (see Air Mobility Command [2005] for a detailed discussion of this topic in relation to the C-17 *Globemaster III* beddown at Dover AFB). Birds are the wildlife most susceptible to physical conflicts and intense noise and visual disturbance from low flying aircraft. As discussed in the Airspace Use and Management and Land Use/Air Installation Compatible Use Zone (AICUZ) portions of §3 and §4 of this EA, the modified C-5M *Super Galaxy* aircraft are substantially quieter than the current C-5 *Galaxy* engines. Training sorties involving flight proficiency activities that would occur at off-station locations (e.g. simulated instrument approaches and touch and go landings) would be infrequent (approximately 1-2 sorties per month). Airfields used for this purpose would include Atlantic City International Airport (KACY) in New Jersey, Naval Air Station Patuxent River in Maryland (KNHK), and Richmond International Airport (KRIC) in Virginia (Major T. Wilson, personal

communication, November 19, 2010). Of those, flights of the C-5M between these locations would primarily occur between 3,000 to 5,000 feet MSL (KACY) or 12,000 to 16,000 feet MSL (KNHK and KRIC), altitudes typically above those with potential for adverse bird or other wildlife effects.

In light of the highly urbanized setting of Dover AFB, the relatively small increase in aircraft operations associated with the beddown of the FTU, the reduced noise signature of the modified C-5M aircraft, and the comparatively high altitudes at which the aircraft would operate off station, the potential for adversely affecting biological resources from implementation of the Proposed Action would be minimal. Therefore, biological resources have been eliminated from detailed analysis in this EA.

2.8.3 Wetlands

The principal law governing pollution of the nation's surface water resources is the CWA. The Act utilizes water quality standards, permitting requirements, and monitoring to protect water quality. The CWA established a program to regulate the discharge of dredged or fill material into wetlands. It further provides for regulations and procedures for the protection of wetlands and compensation for unavoidable impacts. EO 11990 further protects wetlands by stipulating measures to be taken to ensure Federal actions result in no net loss to the nation's wetlands. Wetlands are defined by the U.S. Army Corps of Engineers (USACE) as areas characterized by a prevalence of vegetation adapted to saturated soil conditions and identified based on specific soil, hydrology, and vegetation criteria defined by USACE (1987). No wetlands are within the areas proposed for facility development for the beddown of the C-5M FTU at Dover AFB, hence this resource has been eliminated from further evaluation.

2.8.4 Coastal Zone Management

Dover AFB is located in the coastal zone regulated by the Delaware Coastal Zone Act. The Regulations Governing Delaware's Coastal Zone state that the construction and/or operation of parking lots or structures not involved in manufacturing is not regulated under Delaware's Coastal Zone Act (DNREC 2001).

2.8.5 Socioeconomics - Housing

As discussed in §2.3.2, the need for transient lodging associated with the C-5M FTU beddown both on and off Dover AFB was evaluated by the SATAF in June of 2010 (Air Mobility Command 2010a). Based upon the anticipated duration of training courses and student throughput (25 students per course), it was determined that existing facilities were adequate both in terms of quantity and quality of rooms. Accordingly, there would be no potential for additional lodging facility construction as part of the FTU beddown and this issue has been eliminated from detailed evaluation.

2.8.6 Transportation

Transportation in this EA refers to the roadway systems that enable persons and goods to move about on Dover AFB and in the vicinity. Roadway networks are classified according to function (interstate, collectors, etc.) and their operational capacity (i.e., the number of vehicles that can pass over a given section of roadway during a specified period) is usually considered in terms of level of service (LOS). The latter is a qualitative and quantitative measure describing operational conditions within a traffic stream such as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety.

The beddown of the C-5M FTU at Dover AFB would utilize the existing roadway networks and would generate comparatively little traffic from use of the administrative, training and maintenance facilities (administrative and training personnel of no more than 300 persons over the course of a year). Transport to and from the airfield would consist of approximately 6 trips per working day as described in §2.2 (Air Mobility Command 2010b). Given the relatively low volume of induced traffic from beddown of the C-5M FTU, there is no potential to impact the LOS of the existing surface transportation infrastructure either on or off the installation. Detailed evaluation of impacts to surface transportation has therefore been eliminated from this EA.

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3.0 AFFECTED ENVIRONMENT

3.1 Airspace Use and Management

Airspace use and management addresses how and in what airspace the C-5M *Super Galaxy* would fly. This section of the EA examines the rules, regulations, and procedures that permit the C-5M to operate safely among all other aircraft using the National Airspace System (NAS). Airspace management and use is interrelated to other resources and topics including, but not limited to: safety, land use, noise, air quality, and biological resources. Background information on Airspace Classifications and Types in the U.S. is provided in Appendix B.

3.1.1 Definition of Resource

The Federal Aviation Administration (FAA) has primary jurisdiction over the use and management of airspace. The NAS is a collective term referring to a common, national asset, airspace managed in the public interest and embracing all facets of a system that includes navigable airspace; terrestrial and satellite based navigation facilities, equipment, and services; airfields or other landing areas; aeronautical information, and services including navigation charts; rules, regulations, and procedures; technical information, manpower, and material. Included in the NAS are those system components shared jointly with or operated by the military.

Navigable airspace is airspace above the minimum altitudes of flight prescribed by regulations under 49 USC, Subtitle VII, Part A, and also includes airspace needed to ensure safety in the takeoff and landing of aircraft by providing adequate obstacle clearances, as defined in both 14 CFR Part 77and Part 97. Navigable airspace is a limited, natural resource the use of which Congress has charged the FAA and its predecessor agencies with administering in the public interest as necessary to promote the safety of aircraft operations and efficiency as a transportation mode on behalf of all stakeholders. Among the varied, competing users whose interests the FAA must balance are those of the military, air carriers, and general aviation against each other and against those of the travelling public and the public at large.

In examining airspace use and management, it is useful to first categorize it based upon whether the FAA provides Air Traffic Control (ATC) separation services within it or not—*controlled versus uncontrolled airspace*. A second tier of classification hinges upon those circumstances when the FAA removes a defined volume of airspace from the public domain, placing other

users on notice that it has been allocated for the benefit of a particular category of user, such as the military. The use may be exclusive, limiting non-participating (e.g. civilian) users or it may simply be advisory, indicating to nonparticipating users of the airspace that military operations are occurring along certain routes, requiring an extra measure of vigilance. This second tier of classification is commonly referred to as Special Use Airspace (SUA).

Federal Aviation Administration Order 7400.2G, *Procedures for Handling Airspace Matters* is that agency's implementing regulation for managing airspace generally and defining particular types thereof (FAA 2010a). The DoD and the Air Force manage airspace delegated by the FAA to them in accordance with the processes and procedures outlined in DoD Directive 5030.19 *DoD Responsibilities on Federal Aviation and National Airspace System Matters* (DoD 2003) and the service specific AFI 13-201 *Airspace Management* (Air Force 2006). When airspace is to be removed from the public domain or have activities occurring within it that are sufficiently different from those otherwise expected then the DoD and the Air Force collaborate with the FAA to ascertain the minimum requirement for such airspace, evaluating the operational and environmental consequences from such proposed airspace designations in compliance with both the FAA and the DoD's operational and NEPA implementing regulations, and tailor the proposed designation (including mitigation of adverse operational or environmental effects) as necessary.

3.1.2 Affected Environment

Both the Proposed Action and the No Action Alternative would involve aircraft operations in a Class D terminal airspace setting and in Class E airspace during terminal and en route operations, as well as involving flight operations occurring within SUA. The Region of Influence (ROI) varies accordingly as their contexts differ. For terminal airspace the ROI generally includes the area influenced by flight operations at Dover AFB. For airfields of this size and scale, a 20-mile radius focus area is appropriate. Therefore, the ROI for terminal airspace is the area that generally lies within 20 miles of Dover AFB. Notice is taken, however, of airports within a similar distance to SUA scheduled or used by Dover AFB.

For SUA, the ROI would extend a greater distance from the installation and would include not only the SUA or other military training airspace within which the aircraft stationed at or

Temporary Duty (TDY) at Dover AFB would fly, but also a similarly dimensioned buffer (approximately 20 nautical miles [NM]) from the SUA or training airspace boundary.

3.1.2.1 Airfields and Airports

The airfield at Dover AFB consists of two intersecting runways, associated taxiways, facilities, and ramp space to support aircraft operations (Figure 3-1). Runway 01/19, oriented generally on a north/south axis, is the shorter runway with a length of 9,602 feet and a width of 150 feet. Runway 14/32, oriented on a northwest/southeast axis, is 12,903 feet long and has a width of 200 feet. Runway 01/19 is the primary runway for based assigned aircraft, transient aircraft, and most instrument arrivals.

Other airfields within the ROI along with selected others that would be or are currently used by C-5 aircraft stationed at Dover are listed in Table 3-1.

3.1.2.2 Air Traffic Control Airspace

Controlled airspace, as depicted in Figures 3-2 and 3-3 for Dover AFB and the vicinity, is airspace of a defined, particular geographic dimension within which the FAA exercises ATC and provides separation services to certain participating aircraft . Controlled airspace is a generic term encompassing five classifications that relate to the level of service provided and degree of regulation imposed. Among the classifications, there are varying levels of minimum weather requirements (in-flight visibility and cloud ceiling heights), minimum airmen certification ratings, minimum aircraft equipment standards, and certain communications requirements. In the eastern US, most airspace greater than 1,200 feet above ground level (AGL) is controlled airspace. Controlled airspace classifications become progressively less stringent; for example Class A airspace is positive control under which all aircraft must operate under Instrument Flight Rules (IFR) and all are provided separation services whereas under Class E airspace aircraft may operate under either Visual Flight Rules (VFR) or IFR and separation services are only provided to IFR aircraft.

In the vicinity of busier airports, controlled airspace extends all the way to the surface. For example, the airspace immediately surrounding Dover AFB is Class D and an associated Class E surface airspace extension. Dover AFB has a control tower that provides certain ATC services, including sequencing of all aircraft within the 4.6 NM radius ring that defines that Class D

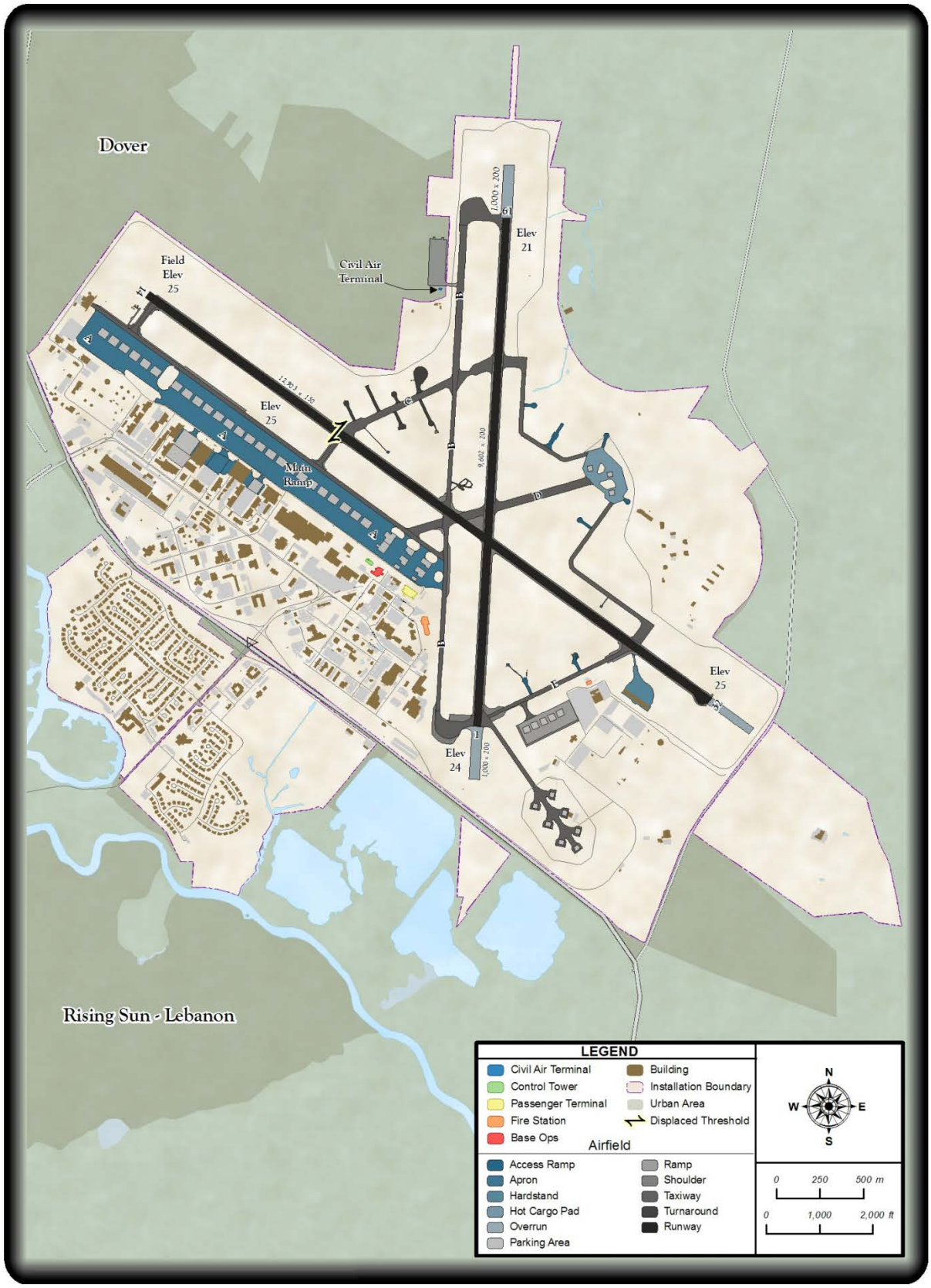


Figure 3-1. Dover AFB Airfield

Table 3-1. Public and Private Use Airfields and Landing Areas in the Vicinity of Dover AFB and Selected Other Airfields

Airfield/ Landing Area[1]	ICAO or FAA ID	Surface Airspace / Overlying Airspace Classification[2] (feet)	Annual Operations Count[3]	Distance from Dover AFB (NM) and Direction	Published IFR Approach Type	Longest Runway[6] (feet)
Dover AFB[4]	KDOV	Class D / Class E (2,500 MSL)	35,500	—	Precision[5]	12,903
Elliott Heliport	DE24	Class D (KDOV) / Class E (2,500 MSL)	NA	2.1 SW	NA[7]	NA[7]
DelDOT Helistop	0N5	Class D (KDOV) / Class E (2,500 MSL)	20	2.2 NW	NA	NA
Johnson's	DE09	Class D (KDOV) / Class E (2,500 MSL)	NA	3.8 S	NA	2,243 Turf
Dover Downs Helistop	DE03	Class D (KDOV) / Class E (2,500 MSL)	NA	4.2 NW	NA	NA
Chandelle Estates	0N4	Class E Surface to 17,999 MSL	3,800	4.5 N	None	2,533
Delaware State Police Helipad	DE02	Class D (KDOV) / Class E 2,500 MSL	NA	5.3 NW	NA	NA
Jenkins	15N	Class G / Class E (700 AGL)	2,500	5.6 W	NA	2,842 Turf
Delaware Airpark	33N	Class G / Class E (700 AGL)	22,500	8.1 NW	Non-precision	3,582
Smyrna	38N	Class G / Class E (700 AGL)	2,600	12 NW	NA	2,300 Turf
Chorman	D74	Class G / Class E (1,200 AGL)	14,600	18 S	NA	3,588
Ridgely	RJD	Class G / Class E (700 AGL)	27,499	21 SW	Non-precision	3,214
Millville	MIV	Class E Surface to 17,999 MSL	60,000	23 NE	Precision	6,002
Atlantic City International	KACY	Class C	115,394	46 NE	Precision	10,000

Table 3-1. Public and Private Use Airfields and Landing Areas in the Vicinity of Dover AFB and Selected Other Airfields (cont'd)

Airfield/ Landing Area[1]	ICAO or FAA ID	Surface Airspace / Overlying Airspace Classification[2] (feet)	Annual Operations Count[3]	Distance from Dover AFB (NM) and Direction	Published IFR Approach Type	Longest Runway[6] (feet)
Naval Air Station Patuxent River	KNHK	Class D / Class E (2,500 MSL)	NA	67 SW	Precision	11,807
Harrisburg International	KMDT	Class D / Class E (2,800 MSL)	89,298	87 NW	Precision	10,002
Richmond International Airport	KRIC	Class C / Class E (4,200 MSL)	112,264	131 SW	Precision	9,003

Source: FAA 2010b; 2010c

Notes: MSL = mean sea level; AGL = above ground level; ICAO = International Civil Aviation Organization; FAA = Federal Aviation Administration; IFR = Instrument Flight Rule; NA = not applicable; One Nautical Mile (NM) = 6,076 feet or 1.15 Statute Mile (SM); S=south; SW= southwest; W= west; N=north; NE=northeast

[1]Landing areas presented above were selected based on proximity to KDOV as follows: heliports located within 10 NM, private use airports within 10 NM, public use airfields within 25 NM, and those military and scheduled air carrier airports routinely used by C-5 during training sorties for proficiency flights.
[2]See Appendix B for detailed description of Air Traffic Control airspace classifications (Class C, Class D, Class E, Class G).
[3]Operations Counts are from 2010 Air Installation Compatible Use Zone (AICUZ) Study (KDOV), as self-reported on FAA Form 5010-1 Airport Datasheets (0N4, 33N, DE02, 0N5, DE24, DE03), or from FAA Air Traffic Control Organization Tower Counts (KMDT, KRIC, KACY). Annual Operations Counts for KHNK unavailable.
[4]Airport names in *italics* are private use, prior permission required.
[5]A non-precision instrument approach provides lateral course guidance (azimuth) and distance only. A precision approach provides elevation guidance (glide slope) to the guidance provided in a non-precision approach, allowing for lower decision altitudes, an elevation above the ground at which if required forward visibility and cloud ceiling minima are not met, a missed approach becomes required. Installation of specific terrestrial based navigation transmitters (or satellite based global positioning system [GPS]) along with requisite airfield lighting and weather reporting capabilities for publication of a precision approach allows for aircraft operations in more adverse weather conditions compared to a non-precision approach.
[6]Longest Runway length refers to paved runways unless otherwise noted. Runway length refers to greatest dimension available for either a takeoff or landing. Runway 14 at KDOV has a threshold displaced 4,250 feet from the runway end reducing landing distance available from 12,903 to 8,653 feet. Takeoffs and landings in the opposite direction using the reciprocal runway (32) at KDOV have full length available. The precision instrument approaches for KDOV terminated with landings on Runway 01/19 (either direction), the length of which is 9,602.
[7]Dimensions are not provided for heliports.

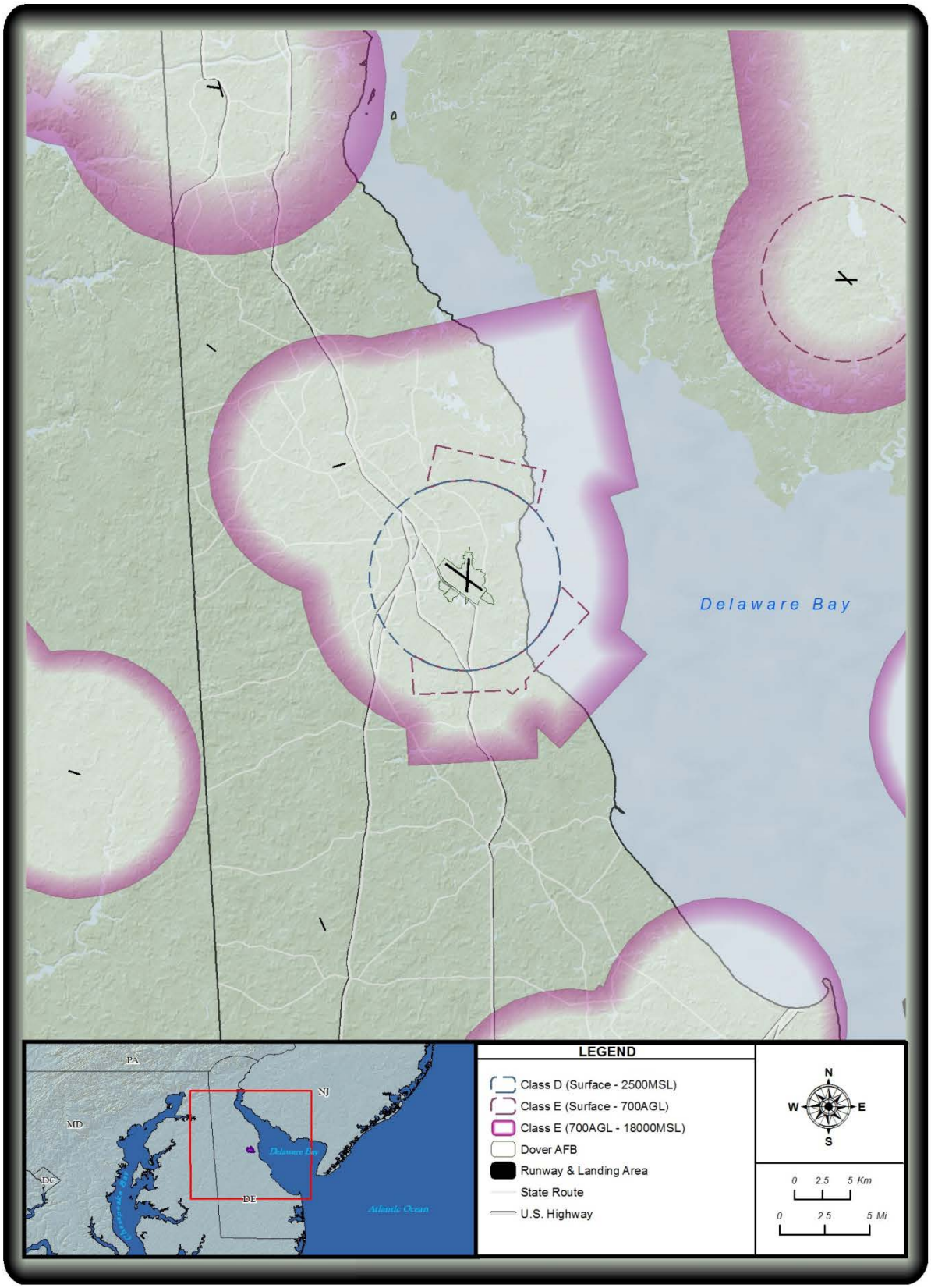


Figure 3-2. Controlled Airspace in the Vicinity of Dover AFB (Plan View)

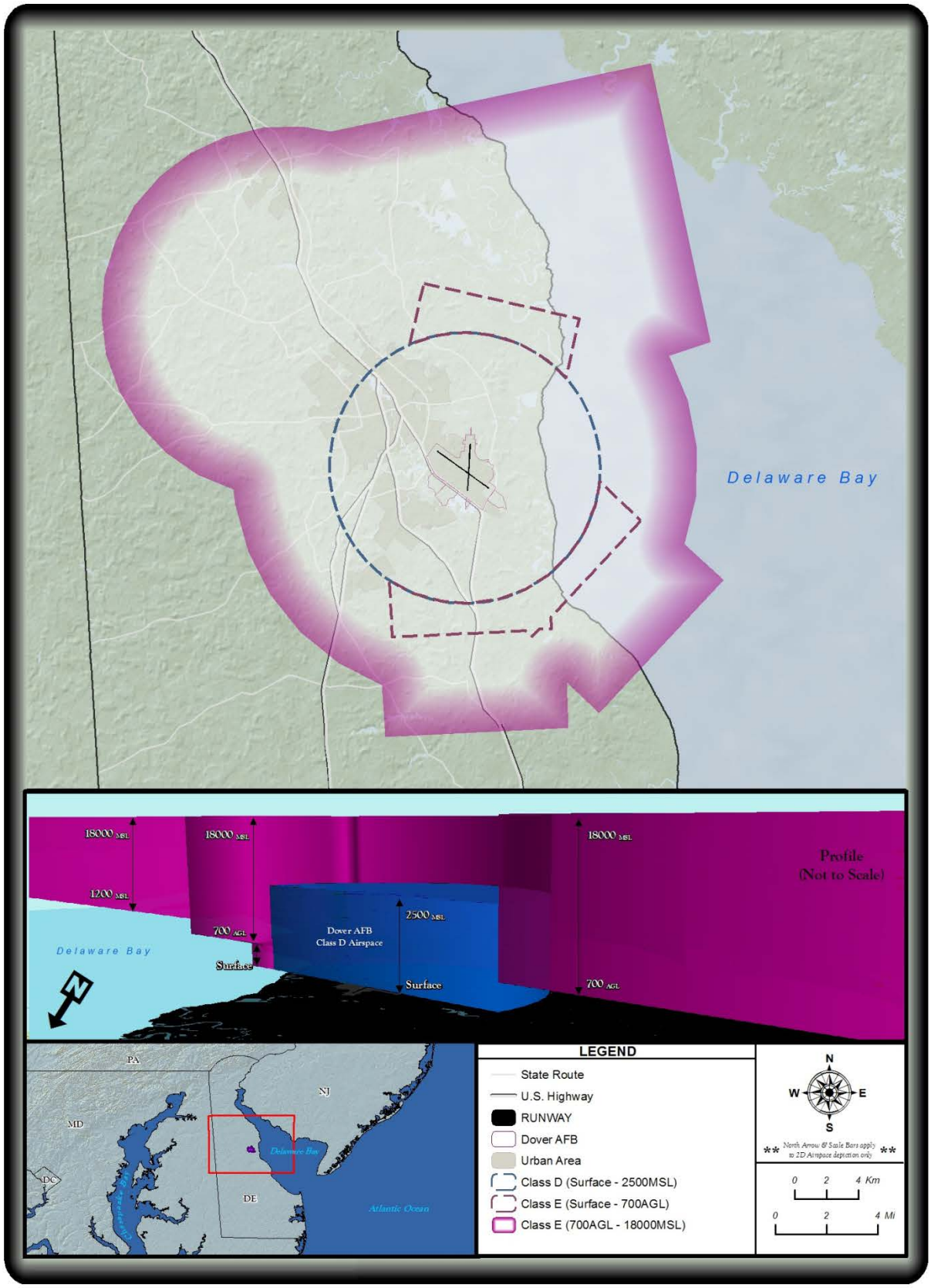


Figure 3-3. Controlled Airspace in the Vicinity Of Dover AFB (3-D)

airspace (FAA 2010d) and separation services on the airfield itself. Pilots are required to establish radio contact with ATC tower when operating within Class D airspace. In addition, the associated Class E airspace surface extension connects Dover Class D airspace to the overlying Class E airspace, encompassing and containing published arrival/departure procedures since ATC separation services may only be provided within controlled airspace. Class E airspace also overlies the Dover Class D airspace ring beginning at 700 feet AGL extending upward to 17,999 feet MSL generally within 5-10 NM of the KDOV, Chandelle Estates Airpark (04N), and Delaware Airpark (33N) airfields. Except for where the Class D surface areas associated with KDOV and the Wilmington/New Castle County airport or where Class E airspace begins at 700 feet AGL for public use airports having instrument approaches, the Class E airspace that begins at 1,200 feet AGL extends laterally and includes the offshore airspace within 12 NM of the shoreline (FAA 2010a). Over the Continental U.S. (including out to the12 NM offshore boundary) the airspace that lies from 18,000 feet MSL upward to 60,000 feet is Class A airspace.

3.1.2.3 Special Use Airspace

Special Use Airspace is a generic term for airspace that has a particular geographic dimension that has been designated either to contain particular hazardous activities or to exclude non-participating aircraft, or both. Unlike airspace within which separation services are provided, SUA is established for a different purpose: to disclose to pilots that activities or flight operations are occurring within a particular geography, and restrict by varying degrees flight operations by aircraft not participating in those activities.

Restricted Areas (RA) and Military Operating Areas (MOA) are two examples of SUA. The types of SUA are found in both controlled and uncontrolled airspace. Within a RA, the activities are hazardous to non-participating aircraft and therefore non-participating aircraft are not permitted entry during those times the RA is active. Within a MOA, non-participating aircraft traffic under ATC is re-routed around the MOA when it's active. Aircraft not controlled by ATC are not restricted from entering the MOA. However, MOAs are charted and uncontrolled pilots are strongly encouraged to avoid active MOAs because the activities occurring therein do not mix well with general aviation traffic. The C-5M *Super Galaxy* would not typically operate within SUA and no SUA is required to support C-5M training or operations by other aircraft types stationed at Dover AFB.

In addition to SUA, the military coordinates with ATC to delineate and disclose linear training routes or other routes and areas within which military operations are routine but are not so hazardous or atypical from ordinary activities that disclosure to and segregation of non-participating users would be required. Below 18,000 feet MSL, the Military Training Route (MTR) program was developed in the interest of achieving a greater level of safety. Along these linear corridors, military aircraft conduct low level; high speed training in a fashion that otherwise would not be permitted under Federal Aviation Regulations (FAR). The two main types of MTRs are Instrument Routes (IR) and Visual Routes (VR), the principal difference between them being whether flight operations are conducted under IFR or VFR. The MTR route centerline is shown on aeronautical charts available to civil users. The inter-theater, strategic airlift role that C-5M Super Galaxy fills makes it impractical and unlikely that it would ever be operated over an MTR; however other aircraft stationed at Dover AFB would. Effects from operation of the C-17 *Globemaster III* have been previously analyzed and disclosed. Aerial Refueling (A-R) Tracks and Altitude Reservations (ALTRV) are typically located above 18,000 feet MSL (i.e., within Class A airspace within which all aircraft are under positive control) or over oceanic airspace. Although the C-5M *Super Galaxy* and other aircraft types stationed at Dover AFB would and do use these, the specific A-R track or ALTRV is dynamically assigned and associated with the tanker aircraft (e.g., a KC-10 *Extender)* that provides the fuel rather than the receiving aircraft.

3.2 Noise

3.2.1 Definition of the Resource

Noise is defined as a sound that, if loud enough, can induce hearing loss or is otherwise undesirable because it interferes with ordinary daily activities, such as communication or sleep. Sound becomes noise once a human reacts to it, most often in terms of annoyance. A human's reaction to noise varies according to the duration, type, and characteristics of the source; distance between the source and receiver; receiver's sensitivity; background noise level; and time of day. Noise (or sound level pressures) interrelate and interact with other resource areas, principally land use and occupational health and safety, but they also influence biological and cultural resources as well.

To quantify noise and describe its effects on the natural and human environment, a basic description of sound and noise terminology is presented.

3.2.1.1 Noise and Sound Metrics

Sound is a series of vibrations (energy) transmitted through a medium (such as air or water) that are perceived by a receiver (e.g., humans, animals). It is measured by accounting for the energy level represented by the amplitude (volume) and frequency (pitch) of those vibrations and comparing that to a baseline standard. As a sound wave moves through the atmosphere, a temporary increase in pressure occurs; it is the pressure change that is detected as sound. The magnitude of the pressure change is the loudness and the frequency of the temporary changes is the pitch.

The human ear can detect pressure differences over a wide range of sensitivities. For example, a whisper heard 2 meters away creates a pressure change from standard atmospheric pressure of approximately 0.0006 Pascals, whereas an M16 rifle at the firer's ear creates a change of 1,000 Pascals. Although one event represents 1,666,666 times more energy than the other, both represent sounds that can be heard by a human ear. A method for readily comparing these vast pressure differences involves describing them in exponential rather than linear terms. This simplifies the units and more closely depicts the way humans actually perceive sound levels. The decibel (dB) is a logarithmic ratio of the increase in atmospheric pressure a sound event causes compared to a defined reference pressure, which happens to be the lowest detectible pressure recognized by the human ear (0.00002 Pascals). The formula for calculating a decibel level is: $20 \log_{10} \{P/P_0\}$ where P is the pressure level of an event and P_0 is the reference pressure (0.00002 Pascals).When using decibels to depict airborne sound pressure levels, 0 dB is the threshold of human hearing and exponential increases occur every 10 dB. An event that generates 60 dB of sound is 10 times louder than one that generates 50 dB. In the example above, the whisper (0.0006 Pascals) translates to 29 dB and the M16 rifle shot (1,000 Pascals) is 153 dB.

The sound pressure level represented by a given decibel value is usually adjusted to make it more relevant to sounds that the human ear hears especially well; for example, an "A-weighted" decibel (dB[A]) is derived by emphasizing mid-range frequencies to which the human ear responds especially well and de-emphasizing the lower and higher range frequencies. In addition

to weighting based on frequency, sound levels are further differentiated by factoring in the effect of time (duration) since sound levels normally vary in intensity and are not continuous.

The building block of noise metrics used in describing aircraft noise is the A-Weighted Sound Level. It simply describes in terms of A-Weighted dB a sound pressure level at any given moment in time. From this building block, several other metrics are derived.

The Maximum Sound Level (L_{max}) is the peak value of all the A-Weighted Sound Levels that occurs during a noise event. The limitation of this metric for noise (annoyance) analysis is that peak sound level without a context of duration or time of day does not adequately address annoyance. For example, most would agree that a single 140 dB L_{max} event lasting 3 seconds (i.e., an aircraft flyover) that occurs once per day around 1:00 PM is less annoying than a 95 dB L_{max} event (a jackhammer in a construction site) that lasts for 6 hours, every day and occurs at 11:00 PM.

The Equivalent Sound Level (L_{eq}) reflects the average continuous sound. It is a metric that takes into account both intensity of an event and duration. The metric considers variations in sound magnitude over periods of time, sums them, and reflects, in a single value, the acoustic energy present during a specified time period. Common time periods for averaging are 1-, 8-, and 24-hour periods.

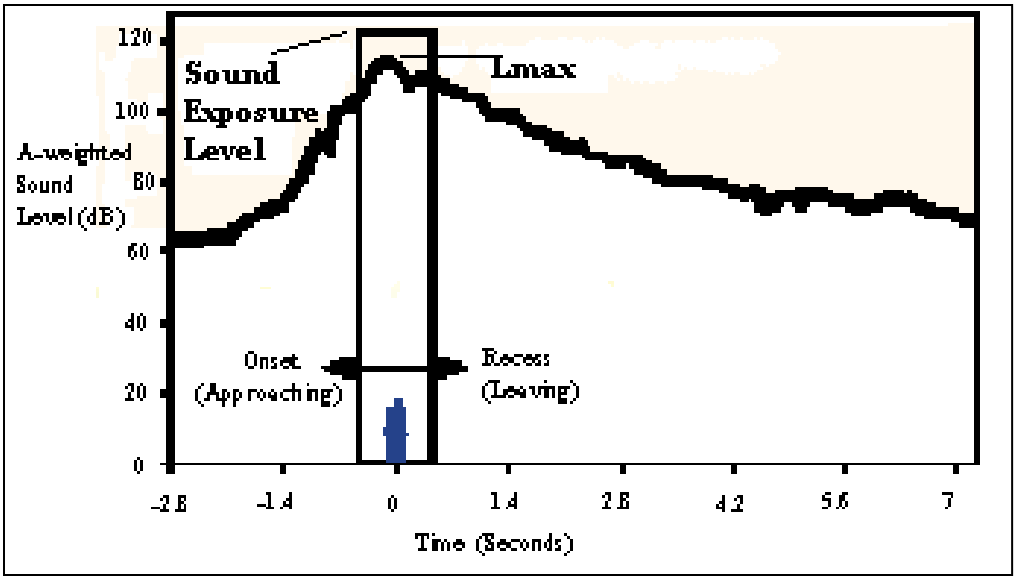
The Sound Exposure Level (SEL) is a specific type of L_{eq} that describes a receiver's cumulative exposure over the course of an event and compresses that energy into a one-second period (Figure 3-4). For noise events whose duration is greater than a second, the SEL will be greater than the L_{max}. Conversely, in events with durations shorter than a second, the SEL will be less than the $L_{max.}$ SEL is a very useful metric for predicting short term activity interruption or reaction by wildlife to a noise stimulus. It is used to allow direct comparison of events having varying intensities and durations, such as an aircraft overflight, by calculating SELs of those events. The fact that SEL is a cumulative metric means that louder events have greater SELs than do quieter events, and longer events have greater SELs than do shorter events.

SELs vary according to the aircraft and engine type, engine power setting, aircraft speed, and slant distance, that is, the distance between the aircraft and the observer (receptor). It is a very useful metric for prediction of activity interruption in humans and varied physiological responses in wildlife. Use of SEL allows direct comparison between sounds with varying levels and

durations by converting them to exposure levels. Table 3-2 contains SELs for aircraft at typical takeoff speeds and power settings at various altitudes directly above the listener.

While the above metrics are useful at describing instantaneous, peak or even comparative noise events, they do not account for multiple event occurrences, the diminution of background noise during nighttime periods that tends to make otherwise unobjectionable sound pressure levels more annoying, or the increased annoyance expressed with events that occur during nighttime periods when many people are sleeping. Therefore an additional metric that accounts for cumulative (or repetitive) exposure, time of day, intensity and duration is used.

The Day-Night Average A-weighted Sound Level (DNL or L_{dn}) describes a receiver's cumulative noise exposure from all events occurring during a 24-hour period; events occurring between 10:00 PM and 7:00 AM ("environmental night") are increased by 10 decibel (dB) to account for greater nighttime sensitivity to noise events. If there were no noise events occurring during the environmental nighttime period, DNL and $L_{eq(24)}$ would be equal.



Source: Air Force 2000a

Figure 3-4. Single Noise Event Showing SEL and L_{max} for a Hypothetical Overflight

Table 3-2. Sound Exposure Levels dB(A)[1]

Aircraft	Speed (knots)	Power	100 Ft AGL dB(A)	500 Ft AGL dB(A)	1,000 Ft AGL dB(A)	5,000 Ft AGL dB(A)
C-5A/B	185	4.9 EPR	131.3	119.6	113.5	93.8
C-5M	160	40,000 LBS	120.5	108.5	102.5	86.9
C-17	200	95% NC	119.8	108.2	102.4	87.3

Notes: Ft= feet; EPR= Engine Pressure Ratio; AGL = Above Ground Level; LBS = pounds of fuel flow per hour; dB(A) = "A-weighted" decibel; NC = % of maximum rated revolutions per minute (RPM) measured at core.

[1]Sound levels calculated using DoD developed SELCALC software; speed and power settings used are typical for takeoff for each aircraft type.

Because of the logarithmic nature of the decibel, this means that a single nighttime event creates the same DNL as 10 identical events during the day. The DNL is used in this assessment when describing noise from aircraft. For temporary, intermittent noise events the L_{max} or SEL is a more useful metric, and they are used for assessing the effect to the noise environment from operation of construction equipment and similar activities.

The use of these noise metrics is chosen based on Federal guidelines developed in order to be able to quantify noise and the reaction of those exposed to it in a community in a sound, objective, and scientifically valid fashion. The Federal government established a working group to review the science of noise and recommend standards for its agencies to use when assessing the effects from noise. The Federal Interagency Committee on Noise (FICON) reviewed the existing science on the subject of urban, industrial, and aircraft noise, land use compatibility, and health and human safety, and validated the use of DNL as the appropriate metric for describing noise from aircraft operations and assessing its effects (FICON 1992). The DoD uses DNL as its common metric to describe noise exposure when describing and assessing noise from aircraft overflights, range operations, and other similar discontinuous but repetitive occurrences. Within the DoD, the AICUZ program assesses (among other things) noise related specifically to aircraft and range operations; it is a land-use compatibility program, but noise from aircraft operations is a major influence on land use compatibility. The DoD AICUZ program was developed and adopted by its services (including the Air Force) and AICUZ studies assess predicted noise exposure in terms of DNL (DoD 1977).

The DNL metric has also been adopted by the U.S. Department of Housing and Urban Development (HUD), the FAA, and the USEPA as a common standard for assessing noise levels for compatibility with land uses, health and human safety, and effects on wildlife (Figure 3-5).

3.2.1.2 DoD Air Installation Compatible Use Zone Program

The DoD AICUZ program outlines compatible land uses by first predicting noise exposure zones or contours depicting lines of equal noise exposure that would result from normal operations at a particular place, and then by recommending land uses that are ordinarily considered compatible with the predicted noise exposure level for those locations contained within the noise contours (DoD 1977; Air Force 1998a). In addition to assessing land use compatibility from the perspective of noise, the DoD AICUZ program assesses accident potential and outlines compatible uses in those areas nearest to the runway ends.

The Air Force AICUZ program is that service's implementation of the DoD directive to assess and disclose noise created by operations on an installation with the goal of preventing the encroachment of incompatible uses on the surrounding areas in a way that ultimately compromises the viability of the installation. The Air Force AICUZ program predicts noise exposure by modeling aircraft operations and employing four bands of noise exposure: (1) 65 to 69 "A-weighted" sound level in decibels (dB[A]) DNL; (2) 70 to 74 dB(A) DNL; (3) 75 to 79 dB(A) DNL; and (4) 80 dB(A) DNL or more (*Ibid.*). Within these bands of noise exposure, certain land uses are considered acceptable or unacceptable. For example, residential uses are normally not considered compatible with a predicted noise exposure in excess of 65 DNL and an office use is not considered compatible in an area having a predicted noise exposure greater than 80 DNL (Federal Interagency Committee on Urban Noise [FICUN] 1980).

Specific noise exposure contours are developed for each Air Force installation that has flying activities; these contours are released to the surrounding jurisdictions to guide their land use planning or are used to guide facilities planning on Air Force bases. Areas below the 65-dB(A) DNL are typically categorized as compatible for residential use. The Air Force's policy has been to implement, if feasible, noise level reduction (NLR) measures for on-base residential and public use buildings, with all new buildings being designed and constructed to comply with the appropriate NLR standards (Air Force 1978).

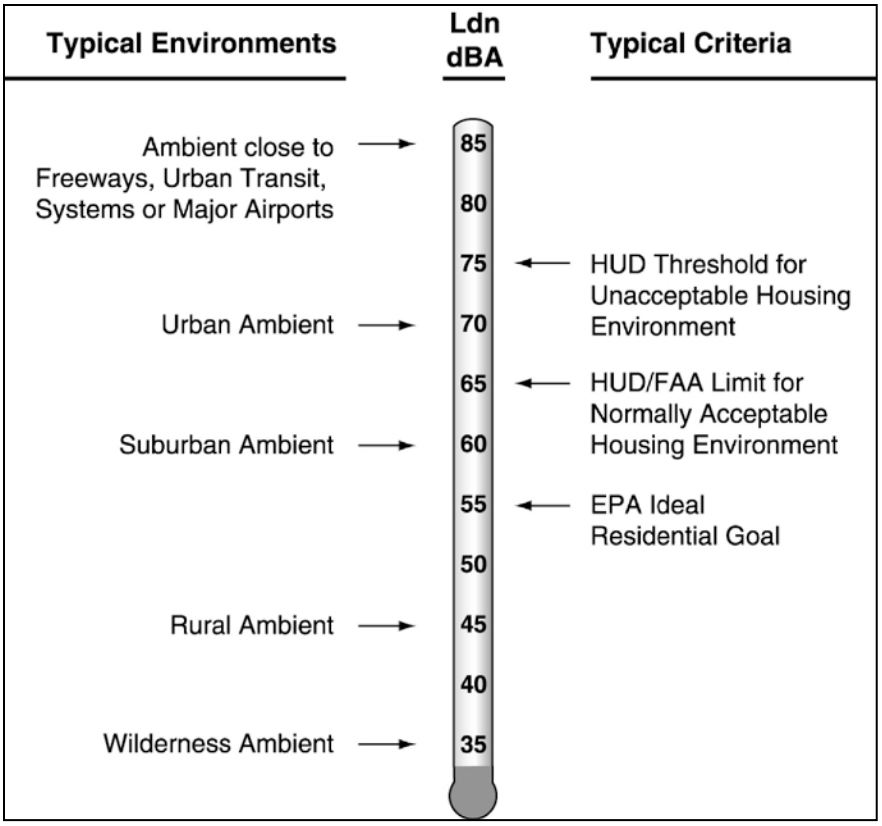


Figure 3-5. Typical Day-Night Average A-weighted Sound Level (L_{dn}) Values and Goals/Criteria for Outdoor Environments

Apart from noise associated with the operation of aircraft, Federal and local governments have established noise guidelines and regulations for the purpose of protecting citizens from potential hearing damage and from various other adverse physiological, psychological, and social effects associated with noise. Occupational safety and health regulations are a primary method of enforcing these guidelines and standards.

3.2.1.3 Hearing Loss

The potential for permanent hearing loss arises from direct exposure to noise on a regular, continuing long-term basis (16 hours a day for 40 years) to levels above 75 DNL. Based on an USEPA report (1974), hearing loss is not expected in people exposed to 75 DNL or less. The FICUN states that hearing loss due to noise: (1) may begin to occur in people exposed to long-term noise at or above 75 DNL; (2) would not likely occur in people exposed to noise between 70 and 75 DNL; and (3) would not occur in people exposed to noise less than 70 DNL (FICUN 1980).

3.2.1.4 Noise Interference

Elevated noise levels can potentially interfere with speech, cause annoyance, or disturb sleep. Annoyance resulting from noise exposure is typically measured via community surveys where the level of tolerance can vary greatly among individuals (USEPA 1974). It is estimated that 13.5% of the population exposed to 65 DNL would be highly annoyed, while 37% would be highly annoyed if exposed to a 75 DNL (*Ibid.*). Research also indicates that the "type of neighborhood" a person inhabits influences their noise annoyance level, with instances of noise complaints being greater for those living in rural areas than in suburban or urban residential areas (Schomer 2001).

Interior noise levels are typically lower than exterior levels due to the attenuation of the sound energy by the structure, with the amount of noise level reduction provided by a building depending on the type of construction and the number of openings such as doors, windows, chimneys, and plumbing vents. The approximate reduction in interior noise is 15 dB(A) when windows are open and 25 dB(A) for closed windows (USEPA 1974).

3.2.2 Affected Environment

The noise environment at Dover AFB primarily consists of noise created from aircraft operations. This noise setting was described in detail in the installation's August 2010 AICUZ report (Air Force 2010a). Other sources of noise include vehicle noise, routine operation of equipment and machinery (e.g., generators, heating and air equipment), and operation of construction equipment. The effects associated with the presence of noise at Dover AFB are typically examined in light of their affects on land use compatibility and human health and safety

The ROI for a noise assessment is a function of the type of action proposed. For the increased level of flight activity aspect of the Proposed Action and its alternative, the ROI is primarily the installation itself and an areas extending approximately 5 to 10 miles into the surrounding jurisdictions of the city of Dover and Kent County, Delaware. A 20-mile radius from the airfield generally captures this area. For noise effects stemming from construction activities and ongoing operations of facilities, the ROI is more narrowly focused and compact; generally, it would be the area lying within a half-mile to a mile of the proposed construction activities.

3.2.2.1 Aircraft Noise

The bulk of aircraft operations at Dover AFB are conducted by the 436 AW, the host unit on the installation. The 436 Operations Group is home to the wing's primary flying units, the 3 and 9 Airlift Squadrons (AS). The major tenant unit engaged in flight activities is the 512 AW. Flying squadrons in the 512 AW include the 326 AS and the 709 AS. The presence of the Air Force Mortuary Affairs Operations Center at Dover, while not a flying unit, does generate demand for substantial levels of flight activity, reinforcing the installation's already notable role as an aerial gateway.

The Air Force has extensively studied the aircraft noise environment at Dover AFB, preparing and releasing to the public an AICUZ study in October 2010. Prior to efforts conducted for this EA and the 2010 AICUZ study, the most recent noise modeling occurred in 2008 and 2005. The 2010 AICUZ report details the mix of aircraft types and operations conducted at Dover AFB during an average busy day. Aircraft operations for Dover AFB consist primarily of C-5 and C-17 military aircraft. In addition to C-5 and C-17 aircraft operations, numerous types of transient military and civil air carrier aircraft conduct operations at the Base. The 2010 AICUZ study indicates that the average annual operations count of all aircraft at Dover AFB is approximately 35,000 (Air Force 2010a).

The resulting baseline level of predicted noise exposure from current flight activity, for the mix of aircraft found at Dover AFB, is shown as a set of noise contours that are centered about the runways. Figure 3-6 depicts the predicted baseline noise exposure in the general vicinity of Dover AFB. Table 3-3 details the acreage lying within each noise contour. The analysis conducted for this EA does not exactly replicate the 2010 AICUZ baseline due to relatively minor differences in accounting for acreage encompassed by noise contours (e.g., not including acreage over water and certain rights-of-way). As a rule, noise contours are a function of the path over the ground that aircraft fly (flight track), the elevation over the ground they are while operating along a flight track, the power setting of the engines while doing so, the airspeed of the aircraft, and the number of operations along the flight track.

The noise contours at Dover AFB reflect heavily loaded cargo aircraft departing and turning fairly soon after departure and climbing relatively slowly compared to other types of aircraft; straight-in approaches with level flight at medium power settings and slower airspeeds,

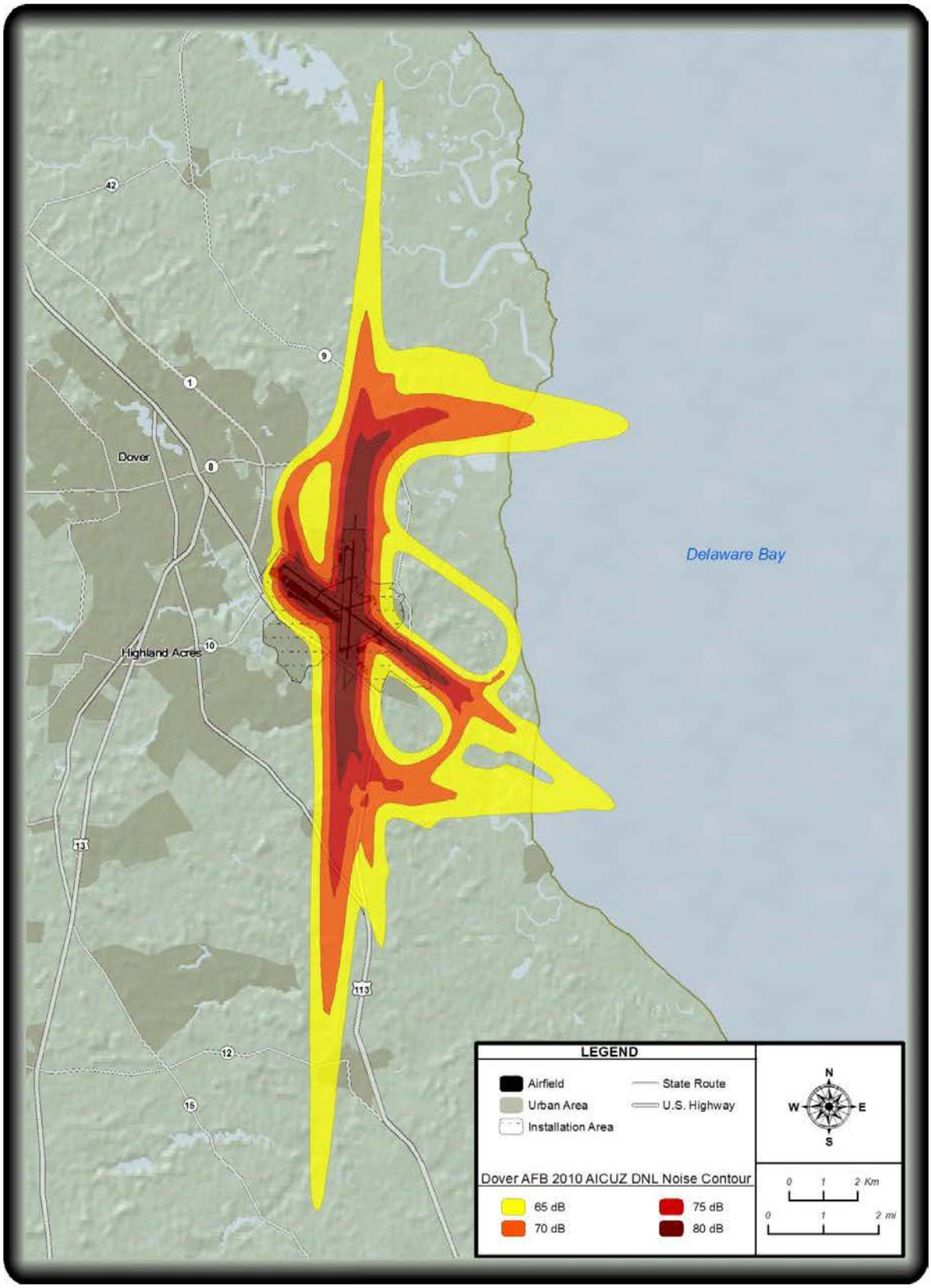


Figure 3-6. Baseline Noise Contours

Table 3-3. Land Area Exposed to Elevated Noise Levels (Total and Off-Base)

Noise Level DNL	Baseline: Total Land Area (In Acres)	Baseline Land Area (In Acres Off-Base – Excluding Water)
65 to 69	10,114	9,586
70 to 74	5,488	4,992
75 to 80	2,518	2,081
>80	2,260	964
Total	**20,380**	**17,623**

Notes: DNL = Day/Night Average A-weighted Sound Level; > = greater than

consistent with instrument arrivals before initiating final descent to landing; and, closed pattern activities (touch and go landings). Another factor influencing the shape of the predicted noise exposure contour is focusing flight operations to the east of the installation, avoiding overflight of the City of Dover to the extent practicable. Runway 14 is seldom used for arrivals and departures from the reciprocal Runway 32 turn to the north as soon as practicable, consistent with safe aircraft operation. As a result, the typical operations found at Dover generate a predicted noise exposure that extends considerable distances along the axes of the extended Runway 01/19 centerline, while also extending shorter distances eastward toward Delaware Bay.

From the departure end of Runway 1, the 65 dB(A) contour extends northward 10.2 miles; to the east, the same contour extends 5 miles from the Runway 01/19 extended centerline; to the south, the contour extends 8.5 miles from the Runway 19 departure end; and, to the west, the contour extends 1.5 miles from the Runway 01/19 extended centerline. Of the 20,380 acres that fall within an area of predicted noise exposure of 65 dB(A) or greater, 17,623 acres lie outside the installation boundary; this number does not include those portions of contours that are off-installation and overlying Delaware Bay.

3.2.2.2 Construction Noise

Noise associated with the operation of machinery on construction sites is typically short-term, intermittent, and highly localized. The loudest machinery generally produces peak sound pressure levels (SPLs) ranging from 86 to 95 dB(A) at 50 feet from the source (Table 3-4). It is

Table 3-4. Peak Sound Pressure Level of Construction Equipment from a Distance of 50 Feet

Equipment	SPL
Bulldozer	95 dB(A)
Scraper	94 dB(A)
Front Loader	94 dB(A)
Backhoe	92 dB(A)
Grader	91 dB(A)
Crane	86 dB(A)

Source: Reagan and Grant (1977)
Notes: dB(A) = A-weighted decibel; Sound Pressure Level (SPL) = Noise from a single source

important to note that the peak SPL range for construction equipment noise does not take into account the ability of sound to be reflected/absorbed by nearby objects, which would further reduce noise levels. Additionally, interior noise levels are typically reduced by 18 to 27 dB(A) due to the NLR properties of the building's construction materials (FAA 1992).

3.3 AICUZ and Land Use

3.3.1 Definition of the Resource

Land use describes the activities that take place in a particular area and generally refers to human modification of land, often for residential or economic purposes. It also refers to use of land for preservation or protection of natural resources. It is important as a means to determine if there is sufficient area for proposed activities and to identify any potential conflicts with local land use plans. This section of the EA describes the on base and off base land use resources that could potentially be affected by the flight operations, construction activities, and ongoing occupancy of facilities associated with the C-5M FTU beddown.

3.3.2 Affected Environment

The ROI consists of Dover AFB and vicinity. Off-base resources consist of land immediately adjacent to Dover AFB and include areas lying within the Kent County, the City of Dover, and

the municipalities of Magnolia and Frederica, Delaware. The ROI also includes the land underlying the airspace within which the C-5M *Super Galaxy* would be flown. Given the nature of its role as a strategic inter-theater transport airlift asset, this ROI generally coincides with the terminal airspace setting of Dover AFB, a distance of approximately 10 miles from the airfield.

3.3.2.1 Planning Activities Conducted by Dover AFB and Surrounding Jurisdictions

Dover AFB occupies approximately 3,220 acres of Federally owned land. An additional 596 acres are controlled under grants or easements and 11 other acres are managed under lease agreements, bringing the total acreage under the influence of the installation to 3,827 (Dover AFB 2008).

Planning efforts off installation are undertaken by Kent County and the incorporated municipalities lying within, principally the City of Dover. The most recent iteration of a master plan developed by Kent County, the *2007 Comprehensive Plan – Building Communities* was adopted in October 2008; a corresponding plan adopted by the City of Dover entitled *The Dover Plan – From the People for the People* was adopted by the City in February 2009.

On installation planning activities are undertaken by the 436 Civil Engineering Squadron/Planning (CES/CEP) group. Two principal planning studies specific to an installation are prepared and maintained by the Air Force. The first is a *General Plan* which is similar to a locality's Master Plan, covering land use, transportation and capital improvement projects. The second, an AICUZ study, has as its object the prevention of encroachment by uses that would be incompatible with the mission of a military airfield. Land uses may be incompatible by virtue of: (1) being located in an area of increased aircraft accident potential; (2) being located in an area of higher than ordinary predicted noise exposure stemming from aircraft operations; or (3) having land uses that adversely affect operations at an airfield, e.g., tall structures or uses that emit smoke, light, glare or attract birds. Among other things, an AICUZ study quantifies and depicts aircraft operations and thus their predicted noise exposure and assesses the degree to which incompatible land uses exist or would be permitted to be created under the then-current land use plans and zoning ordinances of surrounding jurisdictions. AICUZ studies are released to the surrounding community and typically municipalities incorporate the AICUZ data and recommendations into their planning efforts. The AICUZ study also provides the local governments with the information necessary to determine which obstacle evaluation areas

surround Dover AFB. Specific information on the noise environment around Dover AFB may be found in §3.2, Noise; for details on safety areas and obstacle evaluation, see §3.9, Safety. Findings from the Dover AICUZ Study are summarized later in this section.

3.3.2.2 Off Installation Land Use - Kent County and City of Dover, DE

Dover AFB lies primarily within the southeastern portion of the City of Dover within the north-central portion of Kent County. Other nearby municipalities include Leipsic five miles to the north; within 12 miles to the southeast are the communities of Magnolia, Bowers Beach, Frederica, and Milford; within 3 miles to the southwest is Camden; and within 8 miles to the south lies Felton. Most of Dover AFB lies within the boundaries of the City of Dover, except those portions of the installation on the west side of Delaware State Route 1 (SR 1) containing the housing area and golf course. The base forms the southeastern extremity of the City and is surrounded on the north, east, and the south sides by Kent County.

In general, land use in Kent County is mostly open and used primarily for agricultural purposes; however, the county is urbanizing and a significant corridor of urban and suburban uses lie within 3 miles of the north-south transportation corridors of US 13 and SR 1/US 113. Unincorporated lands in Kent County lie primarily east and west of this corridor; this is somewhat by design, in that the planning focus of the County is to focus development into a Growth Zone, an area within which public water supplies and sanitary sewer service are available or into which they would likely be extended.

To the northwest of the installation, the land uses reflect a much more intensely developed pattern compared to agricultural and low-density residential uses.

3.3.2.3 Dover AFB Land Use

The land use and visual characteristics of the area of Dover AFB are typical of most military installations. The crossing runways are at the center of the installation with the operations area, maintenance facilities, and administrative areas in the southern and western portions of the base. Further to the south, across SR 1 are housing and a recreation area (golf course). The northwest quadrant is largely undeveloped; however, the Civil Air Terminal operated by the Delaware River and Bay Authority abuts the north end of the base west of Runway 1/19 on land owned by Kent County, and for which agreements authorizing access to the taxiways and runways exist. On the east side of Runway 1/19 and north of its intersection with Runway 14/32 is the

munitions storage area. Recreational uses such as a campground, aero club, skeet range, and a museum are the predominate land uses of the southeast quadrant of the installation, although some operational uses and aircraft overflow parking occurs in this area of the base (Dover AFB 2008).

The airfield is the predominant influence on land use on the installation. It establishes functional linkages (e.g. industrial and air operations uses are typically adjacent to the runway/taxiway complex) and affects the siting of other uses due to concerns for maintaining compatibility among the land uses. For example, conflicting uses are typically sited outside of areas of high aircraft accident potential or areas having high levels of predicted aircraft noise exposure. The Air Force undertakes a comprehensive planning process to balance competing priorities inherent in operating what amounts to a small city adjacent to a busy airport. AFI 32-7062 *Air Force Comprehensive Planning* addresses this process, guiding the development of a General Plan that examines the existing constraints and opportunities, recommends specific land uses and transportation corridors (typically vehicular), and guides future capital investment in infrastructure and facilities. The 436 CES/CEP at Dover AFB most recently adopted its *General Plan* in 2008 (Dover AFB 2008). The plan states the goals and objectives that would reinforce the installation's mission as an aerial gateway for personnel and logistics providing inter-theater airlift using C-5, C-17, and civilian cargo aircraft. A second, but no less important, mission is to serve as host installation to the largest Joint Service Mortuary Facility within DoD, the only one in the Continental United States.

To achieve the many goals and objectives specific to Dover's missions, policies and recommendations are identified in the *General Plan* for preservation of flight line access for those uses that require it, refraining from creating land uses that would be incompatible in areas of higher accident potential or predicted noise exposure, and enhancing the Mortuary Area to match the expectations of and provide the highest level of respect to service members and families. Specific Area Development Plans for the North End and Mortuary Areas of the installation contain detailed design and site layout recommendations.

3.3.2.4 AICUZ Program

The AICUZ program is an effort to span the land use jurisdictional planning boundaries. The Air Force provides land use recommendations to localities through the AICUZ program and these

recommendations also guide on installation planning efforts. A purpose of the AICUZ program is to promote compatible land use development in areas subject to aircraft noise and accident potential. These guidelines have been established on the basis of studies prepared and sponsored by several Federal agencies, including the DoD, FAA, and HUD. The guidelines recommend land uses that are compatible with airfield operations while allowing maximum beneficial use of adjacent properties.

The AICUZ study is updated periodically in accordance with AFI 32-7063. According to the 2010 AICUZ study for Dover AFB, 111 acres of incompatible land use encroach upon areas of increased accident potential and 723 additional acres of incompatible land use encroach upon areas identified as having elevated levels of aircraft noise exposure (Air Force 2010a). Noise contours from aircraft operations are described more fully in §3.2 and shown in Figure 3-6 above.

Clear Zones and Accident Potential Zones

A Clear Zone (CZ) is real estate shaped in a 3000 by 3000 foot square, centered on and abutting the end of a runway, and containing approximately 207 acres. Open space (undeveloped) and agricultural uses (excluding raising of livestock) are the only uses deemed compatible in a CZ. Of the 827 acres lying within CZs at Dover AFB, 550 acres are owned by the Air Force (on installation) and 277 (remaining) acres are under private ownership. Of those 277 acres, Dover has easements to 183 acres. Of the 277 CZ acres falling off installation, most are compatible; however, an incompatible industrial use (sand and gravel quarrying operation) lies on 74 acres within the CZ south of and associated with Runway 1/19 (Figure 3-7; Table 3-5).

Similarly, Accident Potential Zones (APZs) I and II extend off base north, southeast, south, and northwest of the installation, beginning where the CZ ends, and extending an additional 5,000 feet (APZ I) and 7000 feet (APZ II). All APZ acreages lie off installation. The 2010 AICUZ Study indicates that within APZ I, 9 acres of incompatible residential use exist; within APZ II, 11 acres of incompatible residential and 17 acres of incompatible public/quasi-public uses exist (Table 3-5). It is worth noting, however, that the APZ I and II on the northwest side of and associated with Runway 14/32 differs from the standard design in that it bends northward; typically APZs run along the extended runway centerline. This atypical configuration

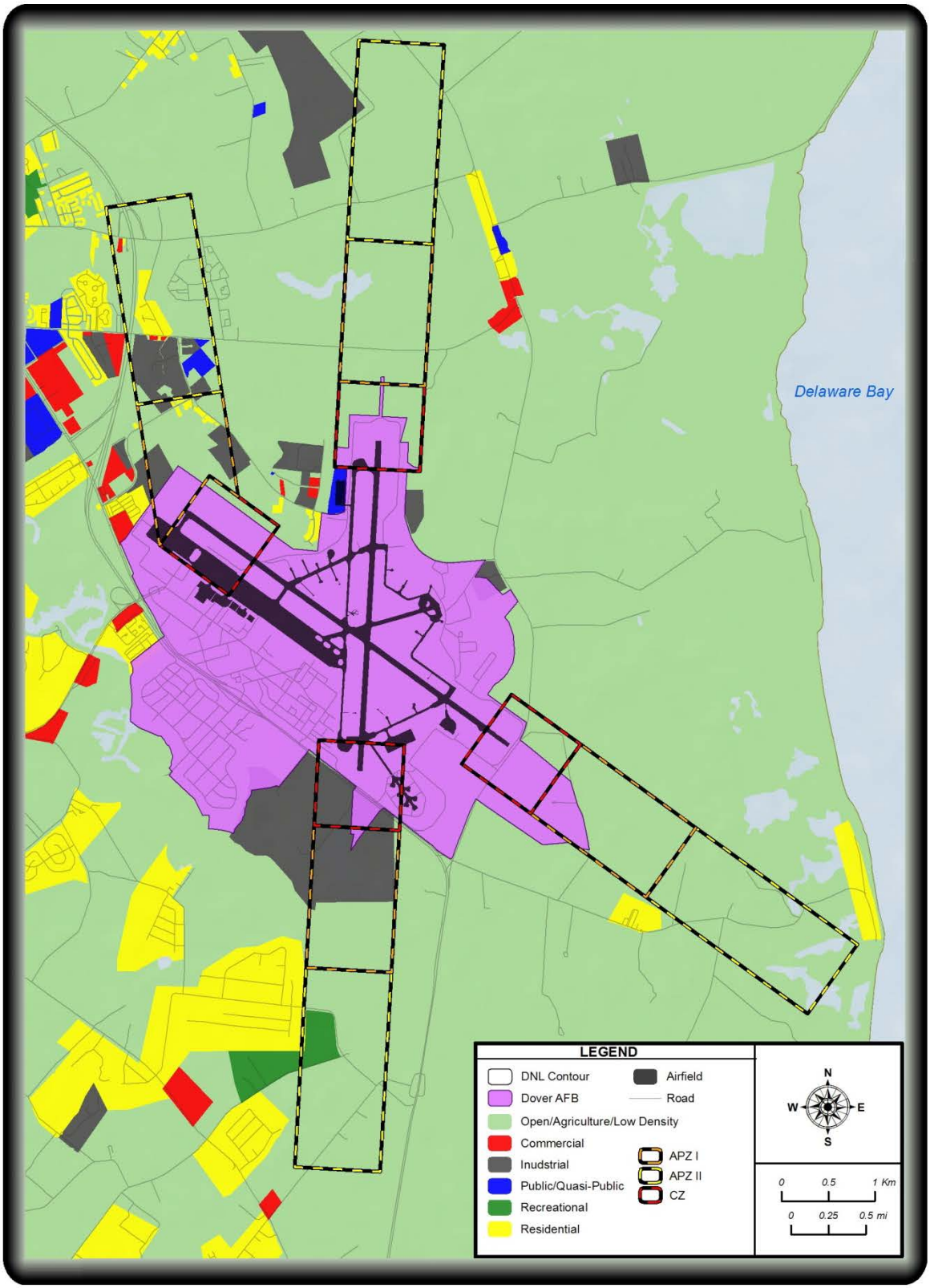


Figure 3-7. Land Use In Areas of Increased Aircraft Accident Potential in the Vicinity of Dover AFB

Table 3-5. Baseline – Off Base Compatibility within Noise Contours

Category	DNL (dB)				CZ	APZ I	APZ II	Total
	65-69	70-74	75-79	80+				
Residential								
Compatible	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
Incompatible	468.00	216.00	20.00	0.00	0.00	9.00	11.00	**724.00**
Commercial								
Compatible	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
Incompatible	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
Public/Quasi-Public								
Compatible	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
Incompatible	0.00	0.00	11.00	8.00	0.00	0.00	17.00	**36.00**
Industrial								
Compatible	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
Incompatible	0.00	0.00	0.00	0.00	74.00	0.00	0.00	**74.00**
Open, Agriculture & Low Density								
Compatible	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
Incompatible	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
Recreational								
Compatible	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
Incompatible	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
Total	**468.00**	**216.00**	**31.00**	**8.00**	**74.00**	**9.00**	**28.00**	**834.00**

Source: Air Force 2010a.
Notes: DNL = Day-Night Average A-weighted Sound Level; dB = decibel; CZ = Clear Zone; APZ = Accident Potential Zone

reflects the preferential runway use and avoidance practices described in §3.1 Airspace Use and Management. Specifically, other than rotary wing or light fixed-wing (i.e., aero club) aircraft, traffic avoids overflight of the City of Dover. Large cargo aircraft such as the C-5 or the C-17 do not arrive to the southeast over the city or land on Runway 14, and on departure from its reciprocal runway (32), they turn to a northerly heading as soon as practicable. The AICUZ program and its implementing instructions recognize that in circumstances such as this, APZs may be altered from the standard design to follow along the flight paths ordinarily taken when they differ from standard departures or arrivals due to terrain, noise abatement considerations, munitions safety, or predominant missions and functions of the aircraft stationed at an installation. Although unusual, bent or curved APZs are authorized and established at military airfields as warranted. With this atypical APZ design for this runway, much of the urbanized area that surrounds the west side of the installation, and potential land use conflicts, are avoided.

Areas of Predicted Noise Exposure Greater than 65 dB(A) DNL from Aircraft Operations

The majority of the off base land under the noise contours is undeveloped and is expected to remain as either agricultural open space or in the domain of the Federal government. The specific noise exposure levels from aircraft operations in the vicinity of Dover AFB were most recently released to local governments for their use in planning documents with the release of the Dover AICUZ study in 2010 (Air Force 2010a). Analysis contained in that document and in §3.2 Noise of this EA indicates that of the 17,623 acres over land lying within a 65 dB(A) or greater contour, a total of 834 acres are occupied with incompatible land uses, nearly all of which are residential (Figure 3-8; see Tables 3-3 and 3-5).

3.4 Air Quality

3.4.1 Definition of the Resource

The CAA (42 USC 7401-7671q), as amended, gives the USEPA the responsibility to establish the primary and secondary National Ambient Air Quality Standards (NAAQS) (40 CFR §50) that set safe concentration levels for six criteria pollutants: particulate matter measuring less than 10 microns in diameter (PM_{10}), sulfur dioxide (SO_2), carbon monoxide (CO), nitrous oxides (NO_x), ozone (O_3), and lead (Pb). Each state has the authority to adopt standards stricter than those established under the Federal program; however, Delaware accepts the Federal standards found in Table 3-6.

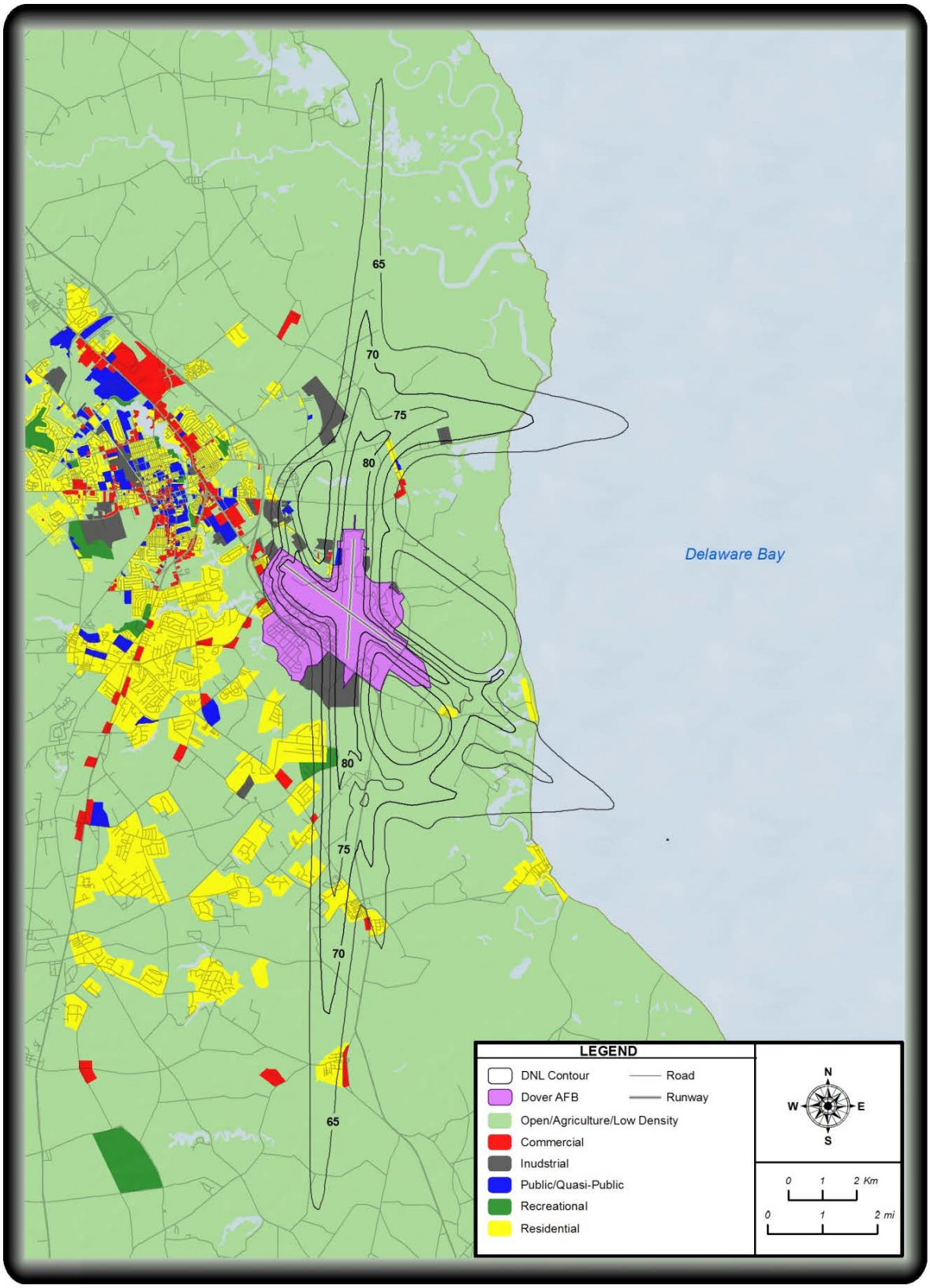


Figure 3-8. Land Use in Areas of Increased Predicted Noise Exposure from Aircraft Operations (Baseline)

Table 3-6. National Ambient Air Quality Standards

Air Pollutant	Averaging Time	NAAQS Primary	NAAQS Secondary
CO	1-hour	35 ppm	35 ppm
	8-hour	9 ppm	9 ppm
NO_x	Annual	0.053 ppm	0.053 ppm
	3-hour	-	0.50 ppm
SO_2	24-hour	0.14 ppm	-
	Annual	0.03 ppm	-
PM_{10}	24-hour	150 µg/m^3	150 µg/m^3
O_3	1-hour	0.12 ppm	0.12 ppm
	8-hour	0.08 ppm	0.08 ppm
Pb	Quarterly Average	1.5 µg/m^3	1.5 µg/m^3

Source*:* USEPA 2010a
Notes: ppm = parts per million; µg/m^3= micrograms per cubic meter

Primary NAAQS are established to protect public health, and secondary standards provide protection for the public welfare, which includes wildlife, climate, transportation, and economic values. Areas that violate air quality standards are designated as "nonattainment" areas, and areas that comply with air quality standards are designated "attainment" areas for the relevant pollutants.

In areas currently designated as being in nonattainment, Federal agencies are required to determine whether their Proposed Action would increase emissions of criteria pollutants above threshold levels (40 CFR §§93.150–93.160). To ensure that Federal actions do not interfere with a state's timely attainment of the NAAQS, the CAA requires that Federal agencies demonstrate that their actions conducted in nonattainment and maintenance areas conform to the purposes of the State Implementation Plan (SIP). According to the implementing regulation, promulgated by the USEPA, proposed Federal actions must be specifically identified in the SIP, must have minor emissions below threshold levels identified in the regulations, or must offset any resulting increases in emissions.

3.4.2 Affected Environment

The ROI for air quality impacts for the action would be the area immediately surrounding Dover AFB. Under the CAA, Kent County is classified as a severe nonattainment area for ground-level

O_3 with respect to the 1-hour NAAQS and moderate nonattainment with respect to the 8-hour NAAQS (USEPA 2010b, c).

The air quality status in Delaware is monitored by DNREC, Division of Air and Waste Management, Air Quality Management Section. The Air Quality Management team operates ten monitoring stations throughout the state, including one located in Kent County (DNREC 2008). The monitoring stations data are updated daily and posted on the DNREC website to report the Air Quality Index (AQI) to local residents. The AQI is an approximate indicator of overall air quality developed by the USEPA that can be easily interpreted by the public. The AQI categorizes the air quality as good, moderate, unhealthy for sensitive groups, unhealthy, very unhealthy, and hazardous. Up to September 2010, the 8-hour ozone NAAQS was exceeded a total of 5 days in Kent County, and the 1-hour NAAQS has not been exceeded to date for 2010 as currently reported by DNREC (2010).

3.5 Water Quality

3.5.1 Definition of the Resource

Water resources are vulnerable to contamination and quality degradation. For this reason, the Federal Water Pollution Control Act, as amended by the CWA of 1977, was enacted to protect these valuable, irreplaceable resources. The Water Pollution Prevention and Control Act (33 USC 26), also known as the CWA Amendments, set the national policy objective to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." The CWA provides the authority to establish water quality standards, control discharges into surface and subsurface waters (including groundwater), develop waste treatment management plans and practices, and issue permits for discharges. A NPDES permit under §402 of the CWA is required for discharges into navigable waters. The USEPA oversees the issuance of NPDES permits at Federal facilities as well as water quality regulations (§401) for both surface and groundwater within the state.

Surface waters are defined by USEPA as waters of the United States and are primarily lakes, rivers, estuaries, coastal waters, and wetlands. Jurisdictional waters, including surface water resources as defined in 33 CFR §328.3, are regulated under §401 and §404 of the CWA and §10 of the Rivers and Harbors Act. Man-made features not directly associated with a natural

drainage, such as upland stock ponds and irrigation canals, are generally not considered jurisdictional waters.

Groundwater is the water that is stored in, and moves through, spaces in underground layers of soil, sand and rock called aquifers (The Groundwater Foundation 2010). The speed at which water moves through an aquifer is dependent on size of the spaces in the soil or rock and how these spaces are connected. The water in aquifers is brought to the surface through a spring, or is discharged into lakes and streams.

3.5.2 Affected Environment

3.5.2.1 Surface Water

There are no surface waters located within the Proposed Action area. The St. Jones River flows along the southern boundary of the base and is located approximately 1 mile southwest of the Proposed Action area. The Little River flows through the northern portion of the base. A drainage system consisting of ditches and below-ground pipes diverts surface-water runoff from the base into these two rivers. Several drainage ditches and culverts located around the Proposed Action area divert water into the St. Jones River.

3.5.2.2 Groundwater

Shallow groundwater is present at Dover AFB and is found within four aquifers – the Columbia, Frederica, Cheswold, and Piney Point. The unconfined Columbia Aquifer is the uppermost aquifer beneath Dover AFB and forms the water table. The water supply of the installation is drawn from the Cheswold Aquifer (Dover AFB 2007). In general, groundwater at the base flows southwest toward the St. Jones River and its tributaries and to the on-base drainage channels.

Groundwater contamination at Dover AFB is currently confined to the Columbia Aquifer, which is not used as a potable water source. Prior studies indicate that shallow groundwater is contaminated with heavy metals including arsenic and cadmium and volatile organic compounds (VOC) from former waste disposal practices and site operations. A variety of VOCs have been detected in both on- and off-site groundwater including trichloroethylene (TCE), tetrachloroethylene (PCE) and carbon tetrachloride (Dover AFB 2005b). The water table at the base is relatively shallow and can be encountered in as little as a few feet below ground surface in some locations. Therefore, construction projects involving, for example, dewatering to install

building footers in areas of groundwater contamination, would require remediation of the extracted groundwater (Dover AFB 2008).

3.6 Soil Resources

3.6.1 Definition of the Resource

Soils are a natural body made up of weathered minerals, organic matter, air and water (Brady and Weil 1996). This body of inorganic and organic matter is home to a wide variety of fungi, bacteria, arthropods, herpetofauna, mammals as well as the growth medium for terrestrial plant life. Soil plays a key role in determining the capacity of a site for biomass vigor and production (physical support, air, water, temperature moderation, protection from toxins, and nutrient availability). Soils also determine a site's susceptibility to erosion (by wind and water), and a site's flood attenuation capacity.

The organic and mineral component of soils is a product of mineral weathering, organic matter decay and balance, and soil moisture dynamics. The rate of weathering (mineral breakdown and organic matter accumulation or loss and decay) is determined by parent materials (the initial organic materials and rock), climate (precipitation and temperature), living organisms (plants, animals, microbes and humans), topography, and time. The process of soil formation is a dynamic and on-going process. Generally speaking, soil weathering or development is slowed by cold weather and lack of moisture; inversely, hot and moist climates accelerate soil development.

Soils vary in texture, depth, and organic matter. Soil texture refers to mineral particle size. Mineral particle sizes are broadly classified as sand, silt, clay or a combination of the three. Sand is the coarsest (largest) particle size, silt is intermediate, and clay is the finest (smallest) particle size. Soil texture and the amount of organic matter directly influence soil shear strength, nutrient holding capacity, and permeability. Soils with fine texture (clay) typically have greater shear strength than more coarse soils. Organic carbon levels also enhance particle aggregation and therefore strengthen soils shear strength.

Soil scientists refer to a soil's fitness for any given function as soil quality or soil health. Soil functions include: protect ground and surface water, protect air quality, resist soil erosion, protect bio-diversity, support plant production, support animal production, and food safety. Soil properties that influence these functions include: soil nutrient levels, water holding capacity, permeability, gas exchange, microbial abundance, and structural stability (Brady and Weil 1996).

3.6.2 Affected Environment

Dover AFB is found on the Mid-Atlantic Coastal Plain Area of the Atlantic and Gulf Coast Lowland Forest and Crop Region (Natural Resources Conservation Service [NRCS] 2006). The predominant soil order in this area is Ultisols, and to a lesser extent Entisols and Inceptisols (Table 3-7). Due to a history of extensive construction-related soil disturbances on Dover AFB, the specific nature of the soils on the installation are not known, and as such they would be classified as Urban (Dover AFB 2008).

Table 3-7. Soil Order Descriptions

Order	Description
Entisols	This soil order is relatively un-weathered. These soils have no diagnostic horizon development. Often found on floodplains, glacial outwash areas and other areas receiving alluvial materials.
Inceptisols	Soils of the humid and sub humid region. Weathering has created minimal diagnostic differentiation in the soil column.
Ultisols	Highly weathered soils found in hot, moist regions. Typically acidic and low in available nutrients.

Source: Brady 1990

Soils in the urban environment can be classified as either natural soils, those formed in natural settings, and anthropogenic soils, those formed in human deposited fill material (Scheyer and Hipple 2005). Fill material is used to increase elevation, backfill ditches, etc., and includes natural soils moved by human activity, construction debris, dredge material, coal ash, solid waste, and any combination of these.

Urban soil has several characteristics not found in natural soils, including:

- great vertical and spatial variability
- modified soil structure leading to compaction
- presence of a surface crust on bare soil leading to restricted water infiltration
- modified pH, usually elevated
- restricted aeration and water drainage
- interrupted nutrient cycling and modified soil organism activity
- presence of man-made materials and other contaminants
- modified soil temperature regimes (Craul 1985)

There are 59 contaminant release sites identified on Dover AFB, with response actions complete at 35 of these sites (Dover AFB 2008). Since some residual contaminants usually remain after cleanup, land use controls (LUCs) must remain in place until concentrations are determined to be at levels considered safe for unrestricted land use. The Environmental Restoration Program (ERP) requires restrictions on certain soil uses in these areas. Those areas that have been cleaned are generally considered safe for industrial land use. The potential for contaminated soils at Dover AFB is more thoroughly discussed in §3.7, Hazardous Materials and Wastes.

3.7 Hazardous Materials and Wastes

3.7.1 Definition of the Resource

Hazardous material is defined by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), Solid Waste Disposal Act, and Emergency Planning and Community Right-to-Know Act (EPCRA) as a substance that, because of quantity, concentration, or physical or chemical characteristics, may present substantial danger to public health, welfare, or the environment. The term hazardous waste, as defined by the Resource Conservation and Recovery Act (RCRA), means any solid, liquid, contained gaseous or semisolid waste, or any combination of wastes that pose a substantive present or potential hazard to human health or the environment. Hazardous wastes must exhibit a characteristic of toxicity, reactivity, ignitibility, or corrosivity, or be listed as a hazardous waste as indicated in 40 CFR §261 and §263, respectively.

CERCLA and the Superfund Amendments and Reauthorization Act (SARA) of 1986 authorize the USEPA to respond to spills and other releases of hazardous substances to the environment. It also authorizes the National Oil and Hazardous Substances Pollution Contingency Plan. Title III of SARA authorizes EPCRA, which requires facility operators with hazardous substances to prepare comprehensive emergency plans and to report accidental releases. EO 12856 (*Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements*, August 1993) requires Federal agencies to comply with the provisions of EPCRA.

Hazardous materials management at Air Force installations is established primarily by AFI 32-7086, *Hazardous Materials Management*. The AFI incorporates the requirements of all Federal regulations, other AFIs and DoD Directives, for the reduction of hazardous materials uses and

purchases. Hazardous waste from Dover AFB must be handled, stored, transported, disposed, or recycled in accordance with both Federal and state regulations.

3.7.2 Affected Environment

Dover AFB contains 23 areas on site that were used for disposing of industrial waste. An estimated 23,000 cubic feet of waste were disposed of from 1951 to 1970. The base's operations generated numerous wastes, some in drums, including paints, solvents, waste fuels, and oil. These wastes were disposed of in various on-base locations including 12 landfills and 3 fire training areas (Dover AFB 2005b).

Shallow on site groundwater in the area is contaminated with heavy metals including arsenic and cadmium and VOC from former waste disposal practices and site operations. Environmental monitoring has detected a variety of VOCs in both on and off site groundwater, including TCE, PCE and carbon tetrachloride. Sediments have also tested positive for VOC contamination (*Ibid.*). Potential health threats include exposure and ingestion to contaminated groundwater used for potable purposes. Direct contact with contaminated soil by workers and potential residents may also be a concern.

Dover AFB evaluated environmental conditions through an August 1997 base-wide remedial investigation (RI). Fifty-nine ERP sites were identified as having hazardous or potentially having hazardous contamination with response actions completed at 35 of these sites (Dover AFB 2008). Fourteen of the sites are petroleum releases. One of these sites, ST05, is located within 500 feet of the proposed FTU facility location. The site is located in the vicinity of Buildings 202 and 204 and covers an area of approximately 252,000 square feet (Figure 3-9). Site ST37 is associated with ST05, but its location lies outside of the APE. The ST05/ST37 site was formerly a fill stand with underground storage tanks (USTs) and fuel lines. At least 3 leaks in the fuel lines were discovered when valves were installed after routine maintenance in early 1987. The leaks were repaired, but fuel releases to the soil were not remediated at that time (S. Seip, personal communication, December 16, 2010).

The fuel lines and USTs were removed during the 1990s. Soil excavated during the UST removals was used as backfill in the excavations. A sheen of free phase fuel encountered during

Figure 3-9. Location of ERP Sites in the Vicinity of Proposed FTU Facilities

several of the UST removals was vacuumed from each excavation. Based on observations of these excavations, it is unlikely that there is recoverable free phase fuel in the area of the former USTs, although residual soil contamination may exist in this area (*Ibid.*).

A 1993 hydrogeologic investigation at site ST05 showed some free phase jet fuel contaminants in groundwater, primarily benzene. Groundwater contamination is being addressed under the ERP per a groundwater remedy for site ST05, and soil contaminants have not been remediated. Dissolved fuel contamination in groundwater is confined to within approximately 100 feet of the vicinity of the free phase fuel (*Ibid.*). Potential health threats include exposure to and ingestion of contaminated groundwater used for potable purposes. Direct contact with contaminated soil by workers and potential residents may also be a concern.

In accordance with the Request for Environmental Impact Analysis (AF Form 813) for this project, some level of fuel contamination may be present in soil and groundwater at this location.

3.8 Socioeconomic Resources and Environmental Justice

3.8.1 Definition of the Resource

Socioeconomic analyses generally include detailed investigations of the prevailing population, income, employment, and housing conditions of a community or ROI. The socioeconomic conditions of a ROI could be affected by changes in the rate of population growth, changes in the demographic characteristics of a ROI, or changes in employment within the ROI caused by the implementation of an action.

Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations requires Federal agencies to consider as a part of their action, any disproportionately highly adverse human health or environmental effects to minority and low-income populations. Agencies are required to ensure these potential effects are identified and addressed. According to the CEQ (1997), a minority population should be identified if it is composed of American Indian or Alaskan Native, Asian or Pacific Islander, Black (not of Hispanic origin), or Hispanic population groups that either exceed 50% of the population in an area, or the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population A minority population can be defined by race, by ethnicity, or by a combination of the two distinct classifications. Race as defined by the U.S. Census Bureau (USCB 2001a) includes:

- White – A person having origins in any of the original peoples of Europe, the Middle East, or North Africa;
- Black or African American – A person having origins in any of the Black racial groups of Africa;
- American Indian or Alaska Native – A person having origins in any of the original peoples of North and South America (including Central America) and who maintain tribal affiliation or community attachment;
- Asian – A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, or the Philippine Islands; and
- Native Hawaiian and Other Pacific Islanders – A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.

The USCB defines ethnicity as either being of Hispanic origin or not being of Hispanic origin. Hispanic origin is defined as "a person of Cuban, Mexican, Puerto Rican, South or Central America, or other Spanish culture or origin regardless of race" (*Ibid.*).

Each year the USCB defines the national poverty thresholds, which are measured in terms of household income dependent upon the number of persons within the household (USCB 2010a). Under the 2000 Census, individuals earning $8,959 or less and a family of four (2 adults and 2 children) earning $13,874 or less were classified as falling below the poverty threshold (Appendix C) (USCB 2001b). Census tracts in which at least 20% of the residents fall below the poverty threshold are classified as poverty areas and tracts where 40% are poor are classified as extreme poverty areas (USCB 1995).

For the purposes of this analysis, the ROI is defined as the area within the Census Tract from the 2000 Census in which Dover AFB is located (411), as well as Census Tracts within close proximity to Dover AFB (Table 3-8; Figures 3-10 and 3-11).

3.8.2 Affected Environment

3.8.2.1 Demographics

Dover AFB lies entirely within Kent County and is within the corporate limits of the City of Dover. The base occupies an area of approximately 3,220 acres, with an additional 596 acres under grants or easements and 11 acres under lease agreements (Dover AFB 2008). As of the 2000 Census, the population of Delaware and Kent County was 783,600 and 126,697

Table 3-8. 2000 Census Tracts and Population within the Region of Influence

Census Tract	Population	Census Tract	Population
404	1,156	415	3,789
405	8,218	416	2,299
406	2,380	417.01	3,789
407	4,470	417.02	3,343
408	2,770	418.01	7,633
409	2,407	418.02	2,612
410	4,602	421	3,216
411	3,849	422.01	6,075
412	3,429	422.02	5,977
413	2,126	424	1,572
414	3,018	**Total**	**78,730**

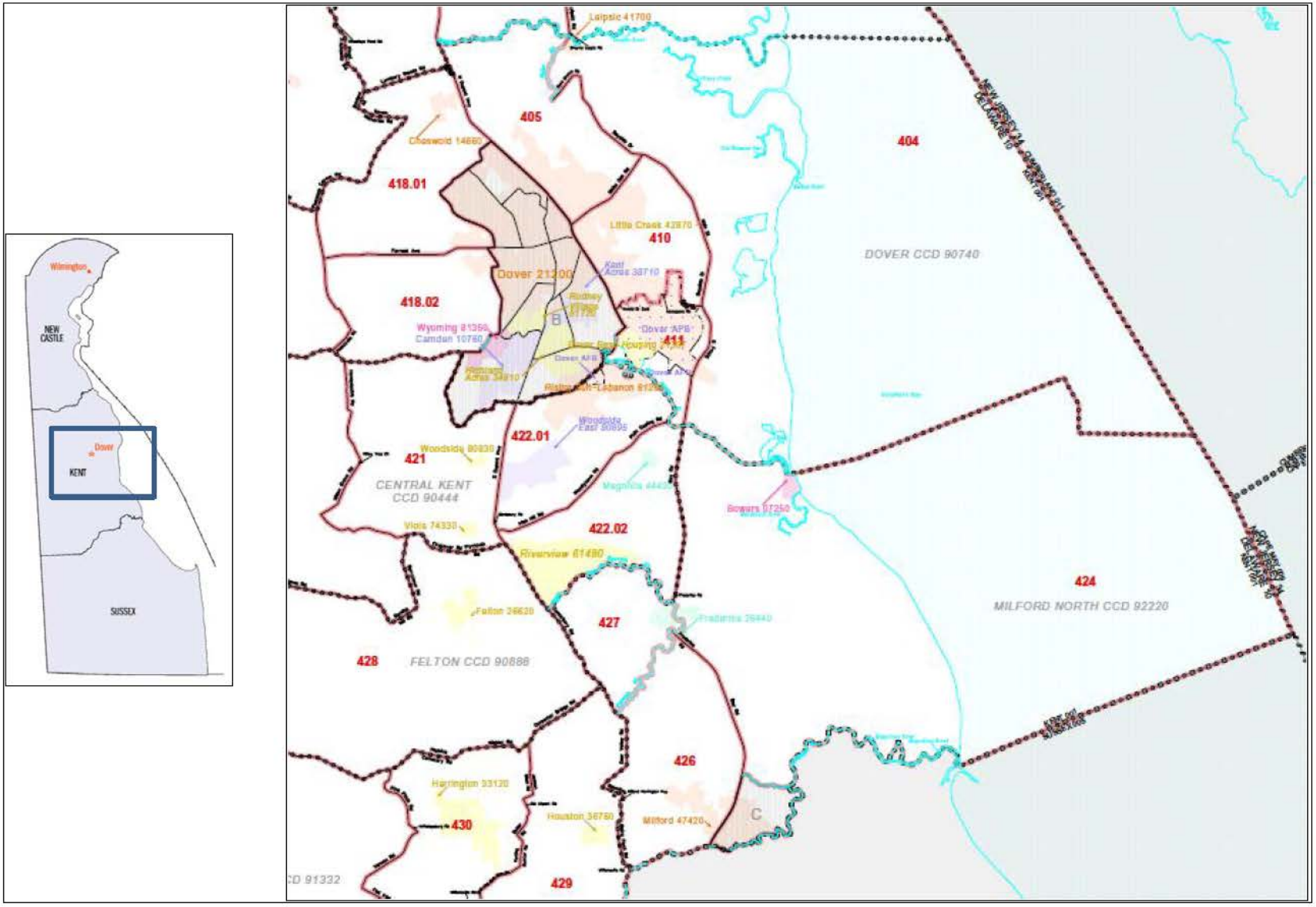
Source: USCB 2001c

respectively (USCB 2010b). By 2009, population in Delaware increased 13% to an estimated 885,122 persons and 25% in Kent County to an estimated 157,741 persons for the same period (USCB 2009). The population within the ROI in 2000 was 78,730 (USCB 2001c). If the same estimated growth rate for Kent County between 2000 and 2009 is used, then the estimated 2009 population for the ROI would be 98,413.

In 2000, the majority population in the State of Delaware, as well as Kent County, the city of Dover, and the ROI, was classified as White (Table 3-9) (USCB 2000a; 2000b). The largest population of minorities was within those Census Tracts that make up the ROI, comprising 29.4% of the overall population (Appendix C) (USCB 2000b). Because the percentage of minority populations of these geographic areas was less than 50%, and there was not a minority population percentage in the affected area meaningfully greater than the minority population percentage in the general population, they were not classified as a minority population that must be identified.

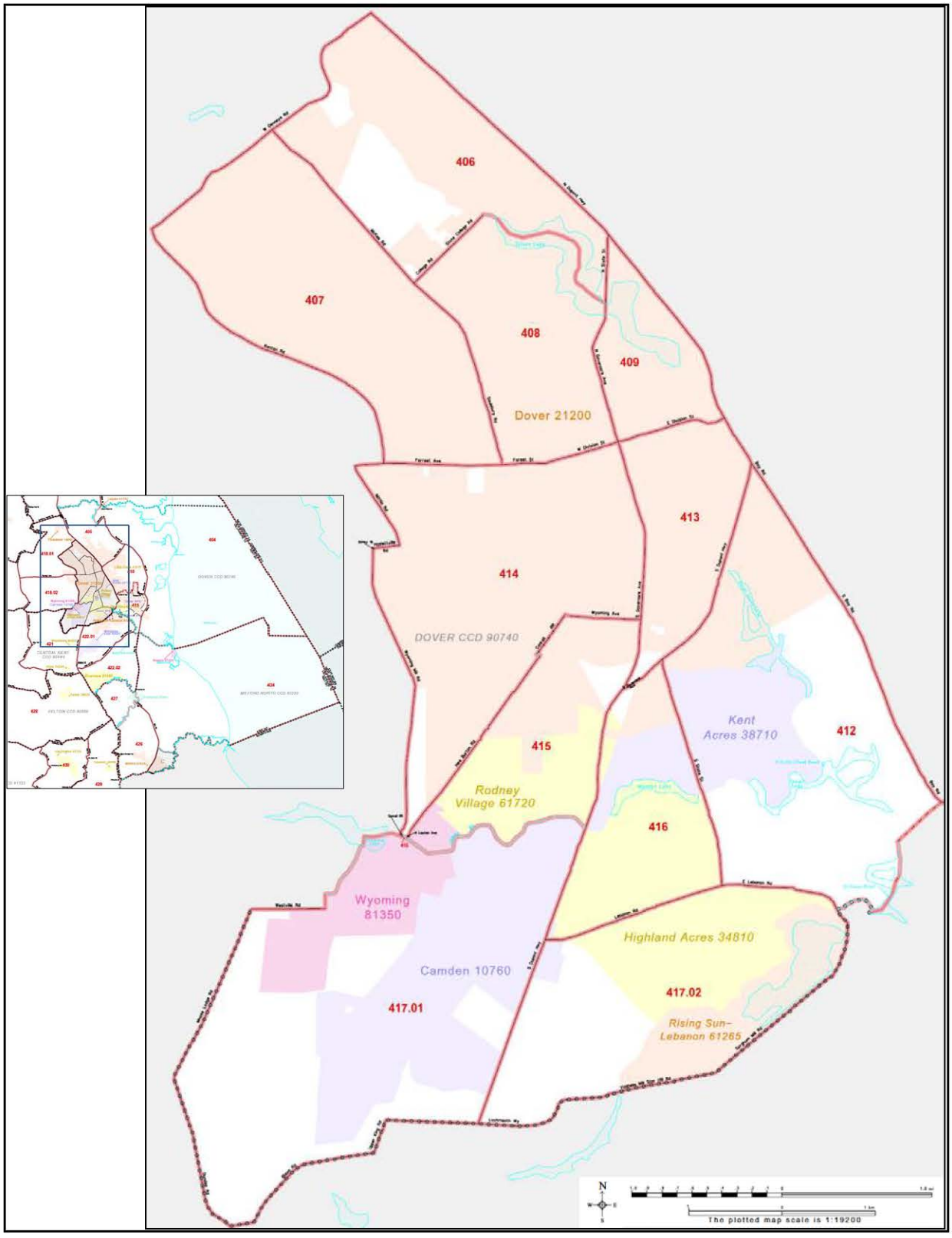
3.8.2.2 Income and Employment

The median household income in 1999 was $46,504 in Kent County and $41,585 in the ROI (USCB 2000b). Earnings data indicate that the median household income in Kent County increased 1.9% between 1999 and 2007 to $47,407 (FedStats 2009). In Kent County, personal income increased from $3.04 billion to $4.48 billion between 2000 and 2008, an increase of



Source: USCB 2008b

Figure 3-10. 2000 Census Tracts within the Region of influence



Source: USCB 2008c

Figure 3-11. 2000 Census Tracts within the Region of Influence

Table 3-9. Geographic Area Demographic Race Profiles from the 2000 Census

Race	Percentage of the Population			
	Delaware	**Kent County**	**Dover**	**ROI**
White alone	74.6	73.5	54.9	67.8
Black or African American alone or in combination	19.2	20.7	37.2	25.6
American Indian and Alaska Native alone or in combination	0.3	0.6	0.5	0.5
Asian alone or in combination	2.1	1.7	3.2	2.3
Native Hawaiian and Other Pacific Islander alone or in combination	0	0	0	0
Some other race alone or in combination	2.0	1.3	1.6	1.0
Hispanic or Latino (of any race)	6.5	4.3	6.3	3.7

Source: USCB 2000a
Notes: ROI = region of influence

approximately 32% (Bureau of Economic Analysis [BEA] 2010a). The majority of that income was from non-farm sources; in 2008, income from farm sources contributed only 1.4% of personal income (*Ibid.*). In FY 2009, the annual payroll for Dover AFB was $340.5 million (Dover AFB 2010b).

Employment decreased an estimated 2.1% in Kent County between the 2000 Census and the 2006-2008 American Community Survey (ACS) 3-Year Estimate (USCB 2008a). The largest employer was the private sector, with over 64,000 employed in 2008 (BEA 2010b). State and local government was the second largest employer, employing 16,646 persons. In FY 2009 there were 7,175 military and civilian employees on Dover AFB (Dover AFB 2010b). The annual unemployment rate in Delaware and Kent County in 2000 was 3.3% and 3.5% respectively; the projected unemployment for September 2010 is expected to be 8.4% for Delaware and 8.3% for Kent County (Bureau of Labor Statistics [BLS] 2010).

3.8.2.3 Poverty

Based on results from the 2000 Census, there are three census tracts within the ROI in which at least 20% of the residents fell below the poverty threshold in order to be classified as poverty areas: 413, 414, and 418.02 (Table 3-10) (USCB 2000b).

Table 3-10. Poverty Status in 1999 within the Region of Influence

Census Tract	Poverty Rate (%)	Census Tract	Poverty Rate (%)
404	18.1	415	5.5
405	10.7	416	6.3
406	8.8	417.01	5.5
407	10.9	417.02	9.7
408	11.5	418.01	8.4
409	11.1	418.02	21.7
410	17.9	42100	7.0
411	4.2	422.01	11.0
412	13.9	422.02	5.5
413	20.4	424	9.7
414	21.0	**ROI Average**	**11.4**

Source: USCB 2000b
Note: ROI = region of influence

3.9 Safety

3.9.1 Definition of the Resource

A safe environment is necessary to prevent or reduce the potential for death, serious injury and illness, or property damage. Safety and human health issues address workers safety and health during construction, as well as employee safety during the daily operations of the facilities. Human health and safety for the purposes of this analysis are defined as both occupational hazards associated with the construction and daily operation of the FTU and potential impacts to general human health and safety of people near operating facilities.

3.9.1.1 Occupational Health and Safety

The Occupational Safety and Health Administration (OSHA) program's purpose is to protect personnel from occupational deaths, injuries, or illnesses; OSHA standards (29 CFR) govern general safety requirements relating to general industry practices (§1910), construction (§1926)

and elements for Federal employees (§1960). These standards include guidance for entry into areas in which a hazard may exist.

Air Force Instruction 91-301, *Air Force Occupational and Environmental Safety, Fire Protection, and Health* (AFOSH) *Program* (Air Force 1996a), implements Air Force Policy Directive (AFPD) 91-3, *Occupational Safety and Health* (Air Force 1993), by outlining the AFOSH program and ensures the requirements of 29 CFR §1960, *Basic Program Elements for Federal Employees Occupational Safety and Health Programs and Related Matters*, are satisfied. The AFOSH program's purpose is to minimize loss of Air Force resources and to protect Air Force personnel from occupational deaths, injuries, or illnesses by managing risks. In conjunction with AFI 91-202, *Air Force Mishap Prevention Program* (Air Force 1998b), these standards ensure all Air Force workplaces meet OSHA requirements. This instruction applies to all Air Force activities.

3.9.1.2 Aviation Safety

Aviation safety, for the purpose of this analysis, is defined as both aircraft ground and flight operations. The regulatory standard for safe operation of aircraft is governed by 14 CFR *Aeronautics and Space*, Chapters 1-3, The regulatory agency governing aviation operations and safety is the FAA. Air Force Instruction 11-202V3 *General Flight Rules* (Air Force 2010b), implements the general flight rules that govern Air Force aircraft flight operations as prescribed by 14 CFR, 14 CFR exemptions, and FAA authorizations.

Airfield Safety

Federal Aviation 14 CFR §139, *Certification of Airports*, governs civil use of airfields within the United States. Air Force Instruction 13-204V3, *Airfield Operations Procedures and Programs,* implements AFPD 13-2, *Air Traffic Control, Airspace, Airfield, and Range Management* (Air Force 2007). These instructions prescribe policy for airfield management programs, airfield operations, and airfield safety procedures.

The most prominent facilities considered under current safety standards that are located on an airfield are runways, taxiways, aircraft parking areas, navigational aids, lighting systems, signage, and markings. Airport safety also includes emergency response capability, wildlife management, and obstacle evaluation.

Emergency response is the capability of the airfield to provide firefighting and emergency medical services in the event of a mishap. Wildlife management encompasses animals on or near the airfield as well as bird activity in the airspace surrounding the airfield. However, wildlife management also encompasses bird activity outside the vicinity of the airfield. Obstacle evaluation determines whether tall natural or manmade structures are a risk to aircraft flight operations.

Emergency Response

Air Force Instruction 32-2001, *Fire Emergency Services Program* (Air Force 2008), implements AFPD 32-20, *Fire Emergency Services (FES)* (Air Force 2003), DoD Instruction 6055.06, *DoD Fire and Emergency Services Program* (DoD 2006), OSHA, and National Fire Protection Association (NFPA) standards. Air Force Airport Rescue and Fire Fighting (ARFF) personnel provide fire prevention and protection, fire fighting, rescue, and hazardous materials (HazMat) response capabilities to prevent or minimize injury, loss of life, and damage to property and equipment. Further, ARFF personnel assist primary Emergency Medical Service (EMS) providers, local civil and Federal agencies, as determined by local and mutual aid agreements.

The prescribed staffing and equipment for an Air Force FES activity depends upon the types of aircraft associated with the base's flying mission and level of activity. Dover AFB is staffed and equipped in accordance with the above standards.

Wildlife Management

Aircraft collisions with birds and other wildlife annually cause millions of dollars in aircraft damage and may result in loss of personnel and aircraft. Reduction of strike hazards may be divided into four categories: awareness, control, avoidance, and aircraft design. Wildlife strike hazards may be substantially reduced using a combination of these categories listed above.

The Air Force BASH program goal is the reduction of wildlife aircraft strike hazards (Air Force 1998b). Each AFB has a BASH program plan as required for Air Force installations that support a flying mission. The plan analyzes potential wildlife strike hazards when developing or revising operational procedures, training routes, ranges, instrument approach and departure procedures, establishing MOAs or low altitude tactical navigation areas. Dover AFB currently has a BASH plan the meets its operational requirements.

Obstacle Evaluation

Aircraft landing to or taking off from a runway need an area free of obstructions to safely operate. Areas of concern for aircraft safety are defined clear zones (CZ), APZs, and imaginary surfaces are defined under Part 77 *Objects Affecting Navigable Airspace* as a series of imaginary surfaces that define the maximum allowable height of any structures that may be placed in the vicinity of an active runway. Unified Facilities Criteria (UFC) 2-260-0, *Airfield and Heliport Planning and Design,* contains uniform design standards governing the dimensions of imaginary surfaces, CZs, and APZs at military airfields (UFC 2008).

Flight Safety

In conjunction with the guidance in the above safety sections, the flight safety program is implemented through Federal regulations and Air Force regulations. For example, AFI 11-214 implements AFPD 11-2, *Aircraft Rules and Procedures* (Air Force 2005b), to ensure aircrews fly and train in a safe environment. All aircraft, both civil and military, must conduct flight operations in accordance with 14 CFR §91 General Operating and Flight Rules. Further, each aircraft, or mission design series (MDS) has specific operating instructions for aircrew compliance.

System Safety

The objective of system safety is to identify hazards resulting from the use or operation of a system and to eliminate or reduce hazards throughout the system life cycle to an acceptable level of risks (Military Standards [MIL-STD]-882C 1993). The system safety program is designed to make sure safety, consistent with mission requirement, is included in technology development and designed into systems, subsystems, equipment, facilities, and their interfaces and operation.

3.9.2 Affected Environment

3.9.2.1 Occupational Health and Safety

Construction and rehabilitation projects have associated inherent risks. Potential hazards include, but are not limited to chemical (e.g., asbestos, lead, hazardous material) and physical (e.g., noise propagation, falling, electrocution, collisions with equipment) sources. Individuals contracted to perform rehabilitation and construction activities are responsible for adhering to OSHA requirements to mitigate these hazards. Industrial hygiene programs address exposure to

hazardous materials, use of personal protective equipment, and the availability and use of Material Safety Data Sheets (MSDSs), the latter of which are also the responsibility of construction contractors to provide to workers. Federal civilian and military personnel that have a need to enter areas under rehabilitation or construction should be familiar with, and adhere to OSHA and AFOSH requirements, as well as applicable industrial hygiene programs.

3.9.2.2 Aviation Safety

Emergency Response

The affected environments for emergency response are the airfield, maintenance facilities, and an area within a 12 mile radius around the installation. However, if there is an off installation emergency on the Delmarva Peninsula with Air Force assets, Dover ARFF would respond in some capacity.

Wildlife Management

Dover AFB is located on the Delmarva Peninsula, underneath several major bird migratory routes. There are several wildlife refuges and quarry ponds within 10 miles of the base (Mobility Forum 2008). The Dover AFB BASH plan provides guidance for reducing the potential in and around areas where flying operations occur on or near the airfield. Further, In February 2000, Dover AFB hired a wildlife contractor as a part of their BASH program for bird abatement. Table 3-11 reflects Calendar Year (CY) 06 through CY 10 bird strike data for Dover AFB.

Table 3-11. Dover AFB Bird Strike Data

	CY 06	CY 07	CY 08	CY 09	CY 10[1]
Overall Mishaps at Dover AFB	16	18	38	33	35
Class A or B[2] Mishaps	2	0	1	0	1
C-5 Mishaps at Dover AFB	15	12	8	9	9
Class A or B[2] Mishaps	2	0	1	0	1

Source: J. Willard, personal communication; December 17, 2010
Notes: CY 0*n* = Calendar Year 200*n*
[1]Through November 2010.
[2]Class A mishaps are those in excess of $1M; Class B mishaps are greater than $200,000, but less than $1M

Obstacle Evaluation

The runway geometry at Dover AFB is described in §3.1.2.2, *Airfields and Airports*. A runway is designated Class A when it primarily is used by smaller, propeller driven aircraft requiring

shorter takeoff and landing distances. A runway is designated Class B when it is primarily used by high performance aircraft with greater weights, airspeeds, and airlift capacity. These aircraft require longer takeoff and landing distances.

The runway at Dover AFB is a Class B runway suitable for current base assigned and transient operations. Dover AFB airfield operations currently comply with Part 77 surface areas described in §3.9.1.2.

Flight Safety

The affected environments for flight safety for this EA are aircraft ground movement and maintenance areas on the Dover AFB airfield, and inflight operations within 20 NM of the airfield. Flight safety encompasses all areas discussed in the previous above sections to include (Air Force 2010b):

- Flight Training
- Flight Operations
- Tactical Operations
- Other areas as determined by the Operations Group Commander

Currently, all flight operations conducted at Dover AFB comply with all Federal, Air Force, and Operations Group Commander requirements.

The Air Force does not keep separate safety data for aircraft model within a type, for example C-5B and C-5M data are aggregated in C-5. Safety data collected pertaining to aircraft mishaps applies to all variants of the type. Table 3-12 summarizes the aircraft mishap rates per year for the entire Air Force, and the C-5 aircraft at Dover AFB in particular for FY 2005 through 2009.

System Safety

The affected environment for this EA are the C-5 *Galaxy* aircraft assigned to Dover AFB. Currently, the Air Force C-5 inventory is in the operational phase of the system life cycle. The Air Force has approved engine modifications to its C-5 inventory, extending the system life cycle and system capability.

Table 3-12. Aircraft Mishap Rates

Year	Class A Mishap	Class A Mishap Rate[1]	Fatalities (Pilots)	Fatalities (All)
Air Force				
FY 05	32	1.49	3	0
FY 06	19	0.90	0	0
FY 07	28	1.37	2	0
FY 08	26	1.34	9	0
FY 09	17	0.90	3	0
Dover AFB C-5 Aircraft				
FY 05	1	1.56	0	0
FY 06	2	3.71	0	0
FY 07	1	2.25	0	0
FY 08	0	0	0	0
FY 09	0	0	0	0

Source: Air Force Safety Center Air Force (2010d)
Notes: FY 0*n* = Fiscal Year 200*n;* AFB = Air Force Base
[1]Mishap Rates are expressed in mishaps per 100,000 flying hours

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Airspace Use and Management

4.1.1 Criteria of Significant Impact

The type, size, shape, and configuration of individual airspace elements in a region are based upon, and are intended to satisfy, competing aviation requirements. Potential impacts could occur if air traffic in the region and/or the ATC systems were encumbered by changed flight activities associated with the Proposed Action or another alternative.

An impact to airspace management and use would occur if the Proposed Action or alternative:

- Restricts movement of other air traffic in the area;
- Creates conflicts with air traffic control in the region;
- Changes operations within airspace already designated for other purposes;
- Results in a need to designate controlled airspace where none previously existed;
- Results in a reclassification of controlled airspace from a less restrictive to a more restrictive classification; or
- Results in a need to designate regulatory special use airspace.

When any significant change is planned, such as new or revised defense-related activities within an airspace area or a change in the complexity or density of aircraft movements, the Federal Aviation Administration reassesses the airspace configuration.

4.1.1.1 Airfields and Airports

Airfield capacity analysis is employed to evaluate when development and improvement projects such as additional or lengthened runways, taxiways, or ramp areas would be warranted. For this document, the runway capacity is assessed using Air Force Handbook (AFH) 32-1084 *Facility Requirements*, which draws heavily from civilian airport capacity analysis standards developed by the FAA and published in Advisory Circular (AC) 150/5060-5 *Airport Capacity and Delay* (FAA 1983). Capacity assumptions, whether expressed in terms of annual operations or hourly VFR or IFR operations, are based on runway utilizations that produce the highest sustainable capacity consistent with current air traffic control practices and current regulations governing flight operations. The method for computing airport capacity is the 'throughput method' (*Ibid.*). Throughput capacity is the rate at which aircraft can be brought into or out of the airfield,

without regard to any delay. The capacity of an airfield is not constant and varies considerably based on a number of considerations including:

- Runway design
- Fleet mix of aircraft operating at the airport
- Percentage of takeoff and landing operations
- Climatic conditions
- FAA regulations which prescribe the use of runways based on these considerations

The physical characteristics and layout of runways, taxiways, and aprons are basic determinants of the ability to accommodate various types of aircraft and the rate at which they can be handled. A primary characteristic that affects an airport's capacity is the configuration of its runway system. The FAA has established some basic estimates of capacity by runway configuration. Although every airport is different, the configurations of airport runways may be placed in the following categories:

- Single runway
- Parallel runways
- Open-V runways
- Intersecting runways

Parallel, open-V, and intersecting runways provide more throughput when compared to a single runway. Based on the established FAA estimates as described in FAA AC 150/5060-5 (Figure 2-1 Number 9, intersecting runways), and airport design described in §3.1.2.2 of this EA, Dover AFB has an annual operating capacity, or Annual Service Volume (ASV) of 265,000 operations. An action that caused airfield operations to approach or exceed the ASV capacity would be significant.

4.1.1.2 Air Traffic Control Airspace

An action would have the potential to create a significant impact if it required extensive changes to airport traffic patterns, instrument flight procedures, air traffic control procedures, safety of persons and property on the ground, or change air traffic control airspace classification. Table 4-1 depicts the number of instrument operations or passenger enplanements that indicate an air traffic control airspace reclassification may be indicated.

Table 4-1. Air Traffic Control Airspace Establishment Criteria

Airspace	Number of Annual Instrument Operations	Number Passenger Enplanements
Class C	75,000	250,000
Class B	300,000	5,000,000

Source: FAA JO 7400.2G Procedures for Handling Airspace (FAA 2010a

4.1.1.3 Special Use Airspace

Federal Aviation Administration Joint Order 7400.2G, *Procedures for Handling Airspace*, classifies SUA depending upon whether or not a formal rule-making process is required to establish and chart the type of SUA being proposed, which in turn is a function of whether the airspace is being completely removed from the public domain (FAA 2010a). Establishment or modifications that would enlarge or increase the times of use of Prohibited Areas or Restricted Areas are regulatory airspace actions; establishment or modifications to other SUA are non-regulatory airspace actions. A beddown (or other) action that by virtue of its operational or training requirements necessitates the creation of a regulatory SUA action would be significant.

4.1.2 Proposed Action

4.1.2.1 Airfields and Airports

Under this alternative, the C-5M FTU mission beddown would occur; however, no additional aircraft would be required to support the FTU nor are any proposed to be stationed at Dover AFB. Implementing the Proposed Action would result in a 25% increase in C-5 aircraft operations from approximately 17,701 annual aircraft operations to approximately 15,876 C-5M annual operations; the vast majority would occur under VFR. This increase of nearly 3,175 operations per year represents approximately an 8.9% increase in the overall operations at the airfield. Currently, the runway geometry and taxiway configuration at the Dover AFB's airfield has the capacity to handle the existing C-5 operations along with those additional operations anticipated to occur if the FTU beddown is implemented, as well as the current and future activities associated with other based and transient aircraft expected to use the airfield. As outlined above, FAA AC-150/5060-5 as incorporated by reference in AFH 32-1084 indicates that the ASV for the airfield is 265,000 (Figure 2-1, Number 9 in FAA AC.150/5060-5 [not

reproduced in this EA]). The current ASV capacity that would be utilized would increase by 4%, from 13% to 17%. The effect on airfield capacity utilization anticipated from potential implementation of the Proposed Action would be minor.

4.1.2.2 Air Traffic Control Airspace

Under the Proposed Action, C-5M aircraft operations would increase by 25% compared to those of the existing C-5A/B model. While notable, this level of activity would not be sufficient to make the airspace surrounding Dover AFB a candidate for Class C airspace, largely because that classification is primarily intended for air carrier airports emplaning over 250,000 passengers. The criteria for establishment and maintenance of the existing Dover Class D airspace are based on containing IFR arrival operations between the surface to 1,000 feet AGL and containing IFR departure operations between the surface to the floor of adjacent controlled airspace (FAA 2010a). No changes to airport traffic patterns, instrument flight procedures, or air traffic control procedures are anticipated or proposed under this alternative.

The Proposed Action would not unduly restrict the movement of other air traffic in the area. This area of Delaware has a moderate population density; consequently, the level of civil aviation activity is fairly high compared to other regions of the country. Along the East Coast, however, the airfield and airspace are somewhat separated from other more intense regions, especially when compared to the concentration of air traffic in the vicinity of New York, Philadelphia, Baltimore or Washington, DC. Dover AFB's Radar Approach Control (RAPCON) facility, working in conjunction with the Terminal Radar Control (TRACON) facilities serving airports in those regions work in concert with each other, and the air route traffic control centers (ARTCC) that control the overlying Class E airspace separate all IFR traffic (civil and military) within controlled airspace in the region. The Proposed Action would not create a need to establish additional or new controlled airspace, nor would its implementation require reclassification from one level (Class D) to another, more restrictive level (Class C).

Civil users operating under IFR may notice an increase in airspace utilization; however, the predominant operation type for the FTU is closed pattern operations, typically under VFR and contained within the Class D airspace. To the extent that this increased utilization does occur, civil users operating under IFR to nearby airports would continue to use the standard instrument

arrival and departure procedures as published under Part 97. The level of IFR traffic into those airports is not such that delays and holding would be expected.

With respect to traffic operating under VFR, Class D airspace does have a requirement to establish two-way communications for entry while operations within Class E airspace have no such requirement. Accordingly, the effects arising from increased C-5M operations would primarily influence operations at landing areas (airfields and heliports) lying within the Dover Class D airspace, much as they do today. These effects, likely taking the form of slightly increased frequency congestion and potentially increased but still relatively infrequent occurrences of denial of entry into the Class D airspace due to airspace saturation are possible. The likelihood of such occurrences, however, are predominately a function of air traffic control tower staffing and other factors influencing ATC tower staffing that would affect the ability of controllers to service all users of the NAS. In comparative terms, the number of operations at Dover would compare to those of a smaller, regional air carrier airport such as Gary/Chicago International (FAA 2010e), which has approximately 36,000 annual aircraft operations. The effect upon air traffic control airspace use and management are anticipated to be minor.

4.1.2.3 Special Use Airspace

Selection and implementation of the Proposed Action would not materially affect SUA or other military training airspace. The C-5M does not use SUA (Prohibited Areas, Restricted Areas, Military Operations Areas, Warning Areas, Alert Areas, Controlled Firing Areas, or National Security Areas). Unlike other cargo aircraft with a tactical, intra-theater airlift role, the C-5 also does not use typical linear or area training airspace such as military training routes, low-altitude tactical navigation areas, or slow routes. Except as necessary for takeoffs and landings, or when en route to airports within 150 miles, operation in the low-altitude flight strata (below 18,000 feet MSL) would seldom occur because jet engines are typically inefficient and consume excessive amounts of fuel compared to the high altitude strata (above 30,000 feet MSL).

Additional utilization of A-R Tracks is possible under the C-5M FTU beddown. These tracks lie over the Atlantic Ocean and are used by military aircraft re-fueling while en route to Europe or other destinations. Most A-R tracks are within the mid- and high-altitude strata (18,000 feet MSL and above). At that altitude and over oceanic airspace, there is little potential for effects to other users of the NAS.

4.1.3 No Action Alternative

4.1.3.1 Airfields and Airports

Selection of the No Action Alternative would mean that activities at Dover AFB would continue largely as they have in the past few years with the exception that the C-5 *Galaxy* would receive avionic and engine upgrades. The FTU beddown would not occur at Dover AFB. The increase in C-5 sorties associated with the FTU beddown would not occur and no increased utilization of airfield capacity would occur.

4.1.3.2 Air Traffic Control Airspace

If the No Action Alternative were selected, flight activity at Dover AFB would remain at levels consistently observed throughout the past several years, approximately 35,500 annual aircraft operations (Dover AFB 2010). These levels can and do fluctuate from year to year, depending upon flying hour budget allocations, deployment of flying units away from Dover AFB for extended periods, and changes to the number transient aircraft utilizing Dover AFB. As a result, no changes to air traffic control airspace are anticipated based on current, forecasted levels of flight operations.

4.1.3.3 Special Use Airspace

Implementing the No Action Alternative would not change the C-5 SUA utilization from current levels. No additional SUA would be required by the No Action Alternative.

4.2 Noise

4.2.1 Criteria of Significant Impact

4.2.1.1 Evaluating Noise Effects

When evaluating noise effects, several aspects are examined, including: (1) the degree to which noise levels generated by training and operations, as well as ongoing construction, demolition, and renovation activities are higher than the ambient noise levels; (2) the degree to which there is hearing loss and/or annoyance; and (3) the proximity of noise-sensitive receptors (e.g., residences, schools, hospitals, parks) to the noise source. An environmental analysis of noise includes the potential effects on the local population. Such an analysis estimates the extent and magnitude of the noise generated by the proposed and alternative actions. For purposes of analysis of aircraft operations at Dover AFB, impacts could be considered significant if the

Proposed Action or alternatives resulted in a 3 dB DNL increase in noise exposure at a sensitive receptor. In addition, based on AICUZ guidance, land-use compatibility recommendations begin when predicted noise exposure levels exceed 65 dB(A) DNL. As such, this can also provide an indicator as to when impacts could be considered significant.

For areas of predicted noise exposure with a value of less than the 65 dB(A) DNL level of exposure, a preferred method of analyzing potential impacts is to examine prevailing ambient noise levels at sensitive receptors and compare the predicted noise exposure from the Proposed Action or its alternatives. It is useful to note that some increases of noise levels are not readily apparent to listeners. It is well accepted that sound level increases below 3 dB(A) are not perceptible. Additionally, it should be remembered that due to the logarithmic nature of the dB, a doubling of noise events creates a 3 dB increase. Table 4-2 presents noise levels and their corresponding perception.

Table 4-2. Decibel Changes and Perception

Changes in Noise Levels in dB(A)	General Perception
3	Just Noticeable
5	More Noticeable
10	Twice as Loud
20	Much Louder

Note: dB(A) = "A-weighted" decibel

4.2.2 Proposed Action

4.2.2.1 Aircraft Operations

Implementation of the Proposed Action includes the beddown of the FTU. Under the Proposed Action, C-5M flight operations would increase by 25% compared to both the baseline noise setting and the No Action Alternative. In general, the area of predicted noise exposure above 65 dB(A) would diminish compared to the baseline noise setting, and increase slightly compared to the No Action Alternative (Figures 4-1 through 4-4). The reduction compared to the baseline noise setting is due in large part to substantially quieter engines, as well as their increased

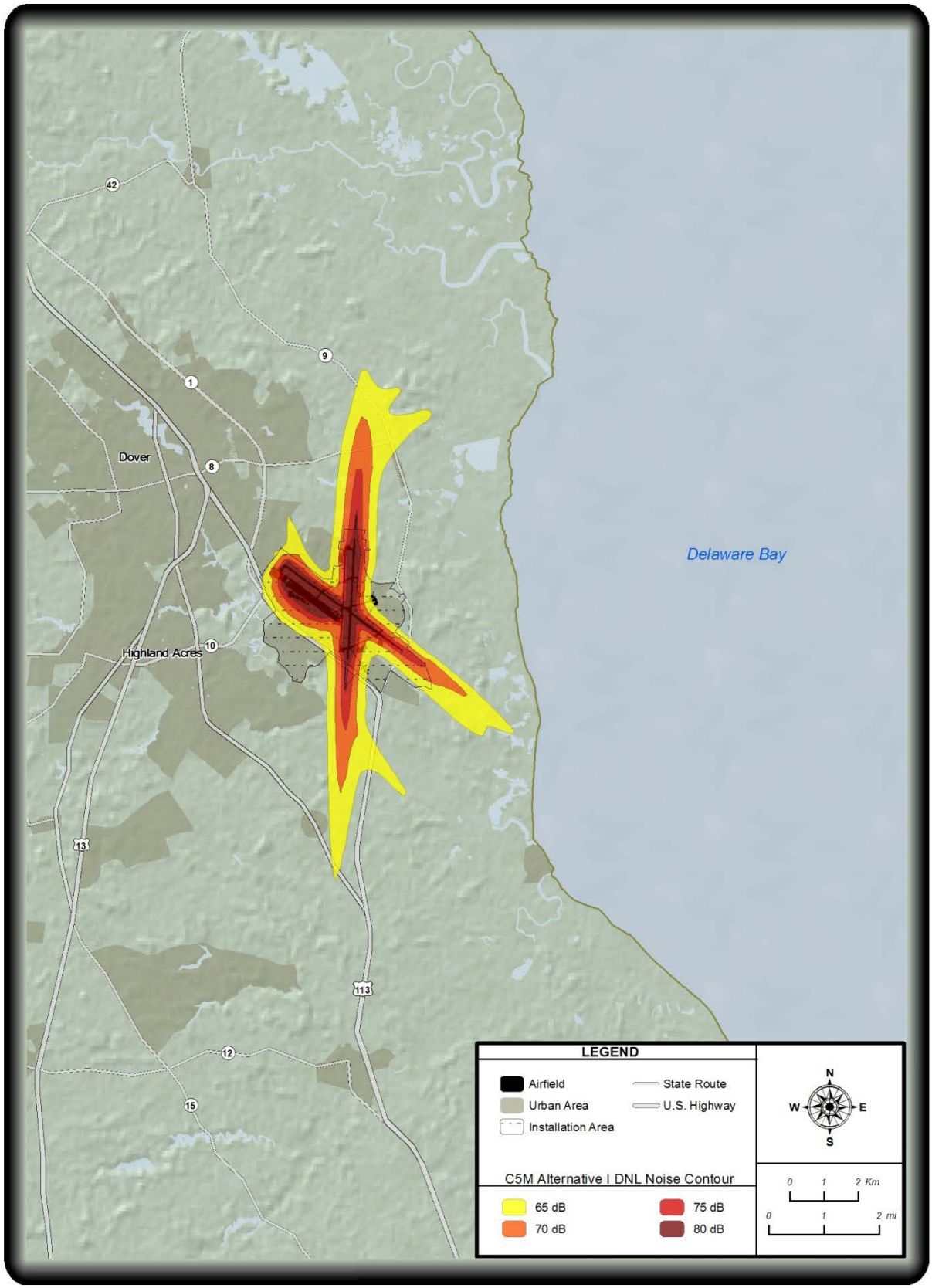


Figure 4-1. The C-5M Proposed Action Predicted Noise Exposure

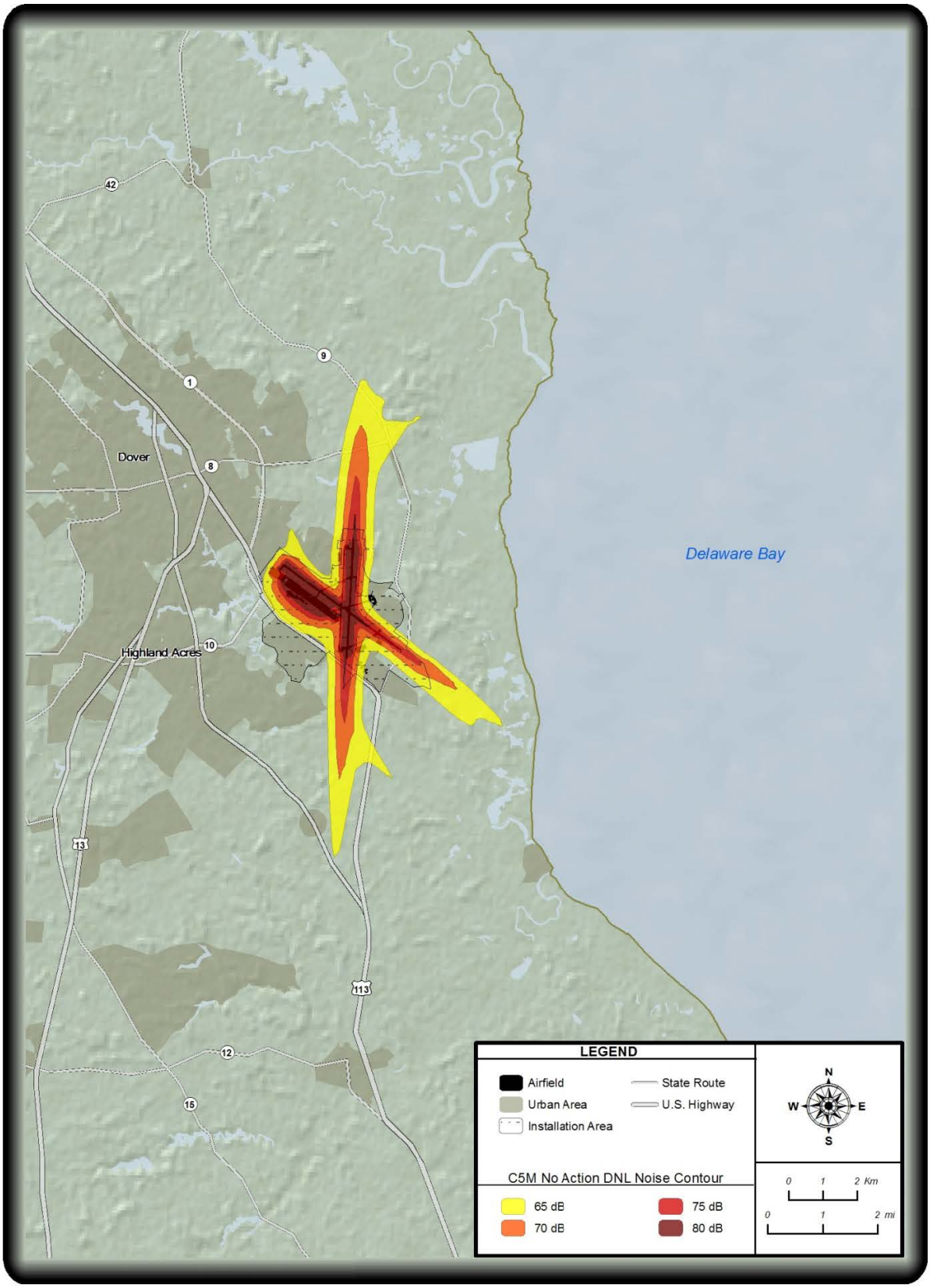


Figure 4-2. The C-5M No Action Alternative Predicted Noise Exposure

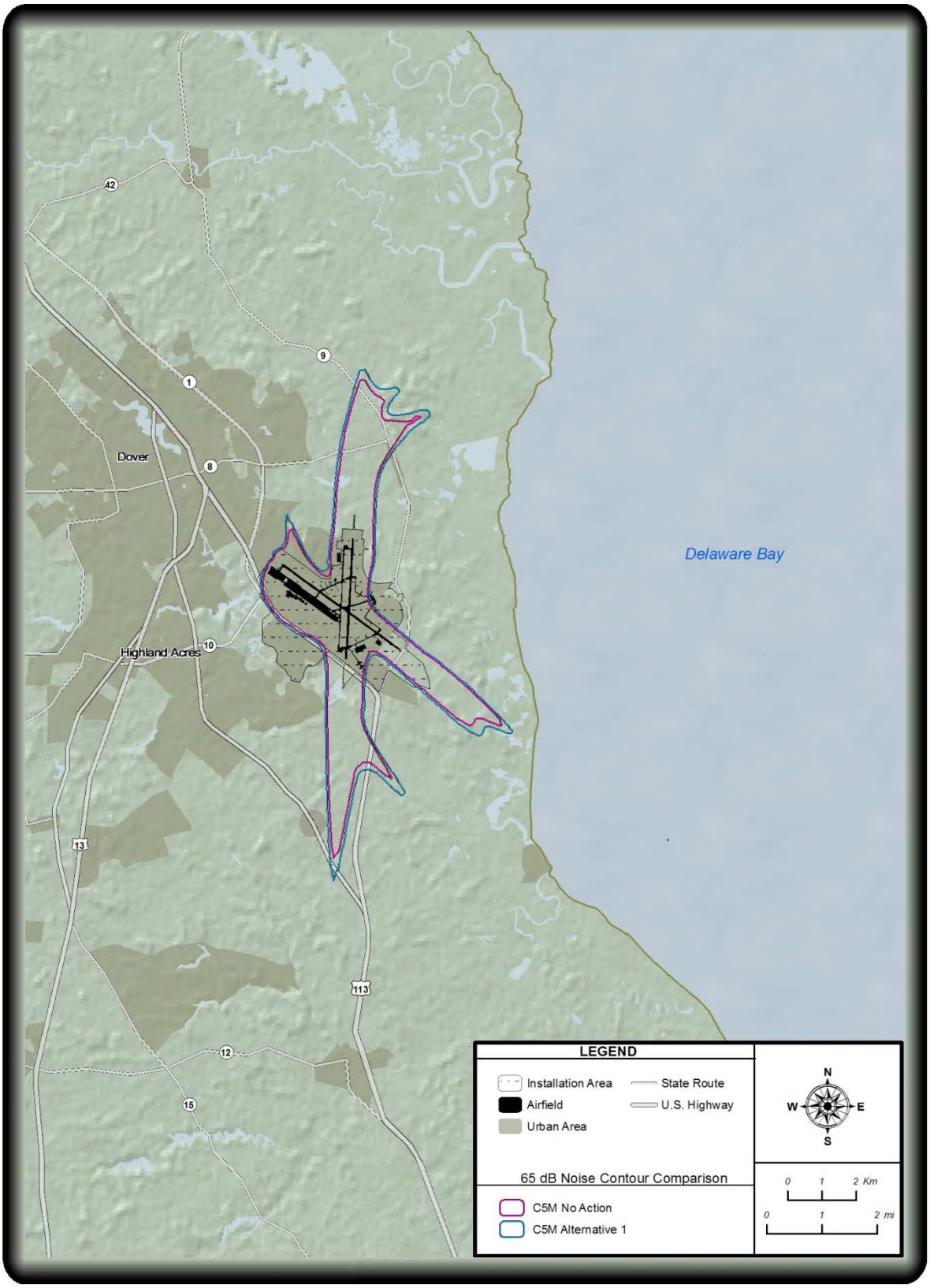


Figure 4-3. Comparison of the Predicted Noise Exposure (65 dB[A] Contour): Proposed Action and No Action Alternative

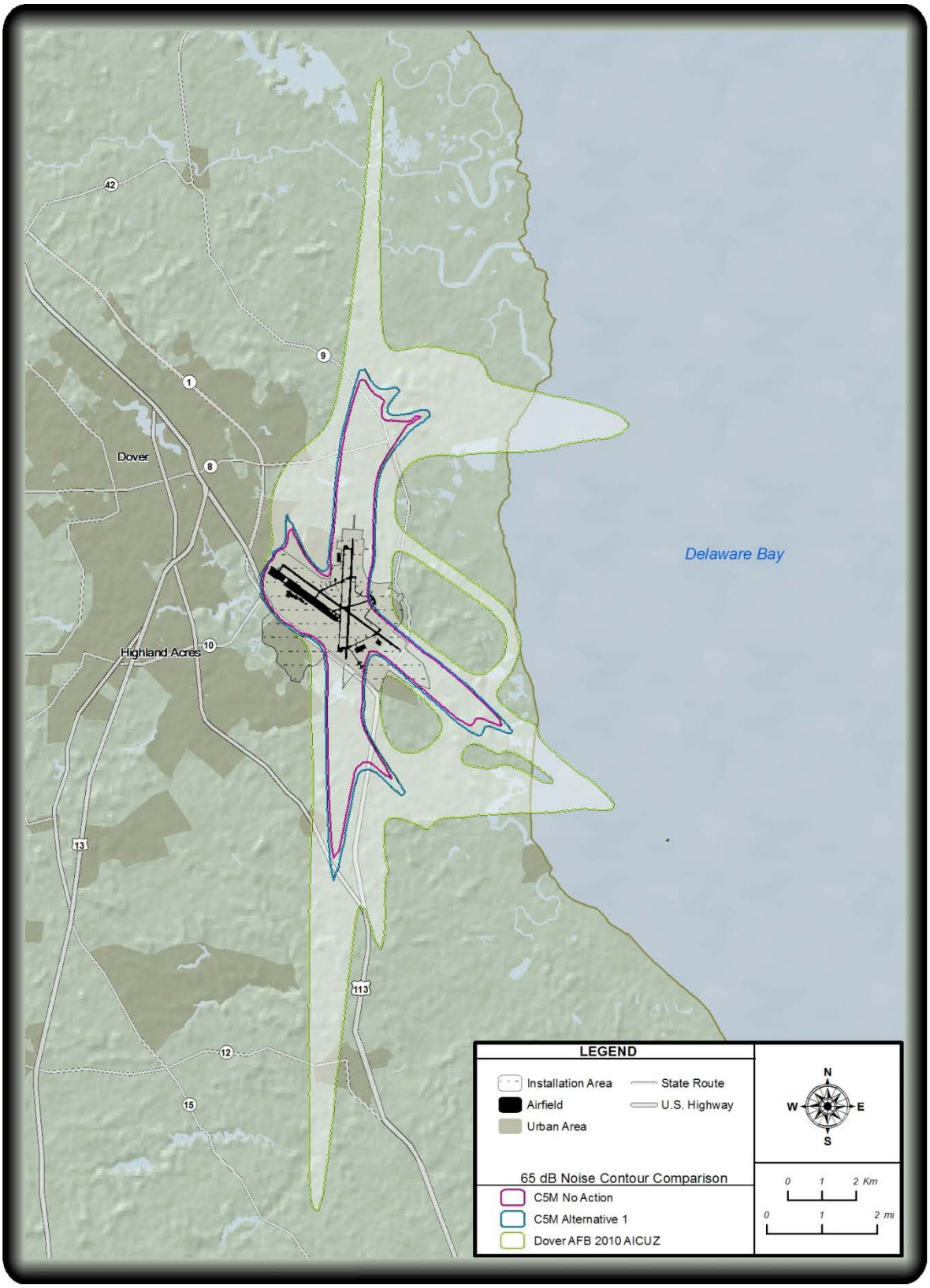


Figure 4-4. Comparison of the Predicted Noise Exposure (65 dB[A] Contour): Proposed Action, No Action Alternative, and Baseline Noise Setting

performance, which allows the aircraft to climb more rapidly, increasing the distance from the source to the receiver. This is most apparent with the disappearance of the lengthy tails extending from the departure ends of Runways 01/19 seen in the baseline contour set. Correspondingly, the acreage embraced within the contours would also be reduced (Table 4-3).

Table 4-3. Comparison of Land Area Exposed to Elevated Noise Levels for Baseline, the Proposed Action, and the No Action Alternative (Total On and Off-Base)

Noise Level DNL	Baseline: Total Land Area (In Acres)	Proposed Action Total Land Area (in Acres)	No Action Alternative Total Land Area (in Acres)
65 to 69	10,114	3,554	2,936
70 to 74	5,488	1,471	1,263
75 to 80	2,518	850	615
>80	2,260	575	632
Total	**20,380**	**6,450**	**5,446**

Note: DNL = Day/Night Average A-weighted Sound Level

From the departure end of Runway 1, under the Proposed Action the 65 dB(A) contour extends northward 3.2 NM; to the east, the same contour extends 3 NM from the Runway 01/19 extended centerline; to the south, the contour extends 4.2 NM from the Runway 19 departure end; and, to the west, the contour extends 1.5 NM from the Runway 01/19 extended centerline, compared to the baseline predicted noise exposure shown in Figure 4-4. These distances are a respective 5.3 NM, 5 NM, 3.7 NM, and 0.02 NM contour increase.

Compared to the No Action Alternative, the Proposed Action set of noise contours would widen and lengthen slightly at the end of each runway due to the increased level of activity of the FTU. The difference in extents between the two respective 65 dB(A) contours is 0.18 NM to the north, 0.22 NM to the east, 0.41 NM to the south, and 0.04 NM to the west.

While the contour size increases slightly compared to the No Action Alternative, it would be markedly smaller than that found under the baseline noise setting as depicted in the 2010 AICUZ study. This is because the C-5A/B airframes would be modified into the C-5M, including

receiving new engines that are expected to be considerably quieter, regardless of whether or not the FTU mission was established at Dover AFB.

As noted, the change to quieter engines achieved by converting the C-5 would substantially reduce the predicted noise exposure contours in comparison to those of the 2010 AICUZ report. The current analysis bases the predicted noise contours on the assumptions that the entire C-5 inventory stationed at Dover would be converted to the quieter C-5M engine, and that transient C-5 aircraft would not be converted. However, since the conversion of individual aircraft to the C-5M is subject to future funding, the model assumptions may not be realized. The implications of this uncertainty in the program, its corresponding effect on noise from aircraft operations, and the effect those changes would have on AICUZ and land use planning recommendations are presented in §3.3 and §4.3 of this EA.

4.2.2.2 Construction Noise

As noted in §3.2.2.3 above, noise associated with construction activities is typically short-term, intermittent, and highly localized. Construction noise does not typically generate a predicted noise exposure of 65 dB(A) DNL or greater because, even at extremely high rates of operation, the equipment itself does not generate noise so intense that averaged over a year it would produce a 65 dB(A) DNL. The nature of sound is such that the temporary noise effects from the operation of construction equipment are minor in comparison to the existing noise exposure from aircraft noise. In essence, the aircraft noise masks the noise from construction equipment;, or stated another way, the overall contribution to the cumulative noise exposure from construction noise is small compared to the existing noise environment created by the operation of aircraft. Overall, impacts associated with construction noise would not be significant.

As the contribution to the DNL by construction generated noise would be minimal (<65 DNL) and the location of construction equipment is unknown, it is not possible to determine whether operation of said equipment would cause the existing DNL contours to shift. Therefore, a detailed analysis of the effect of construction noise on the predicted noise exposure from aircraft operations is not performed in this assessment.

However, it is foreseeable that increased noise from FTU facility construction activities may temporarily occur as a result of the Proposed Action implementation. It would result from both demolition and construction that would produce noise generated by heavy equipment and

vehicles involved in demolition, site preparation, foundation preparation, construction, and finishing work. There would be a possibility of short-term, localized speech interference or annoyance near construction zones, but no severe effects are expected.

In addition, adherence to standard Air Force Occupational Safety and Health regulations minimizes the risk of hearing loss to construction workers. These regulations require hearing protection along with other personnel protective equipment and safety training.

Noise-sensitive receptors would only be exposed to construction noise intermittently, and only for the duration of the renovation project; therefore, an extended disruption of normal activities is not anticipated.

4.2.3 No Action Alternative

4.2.3.1 Aircraft Operations

Selection of the No Action Alternative would mean that there would be no increase to sortie counts or aircraft operations. Flight operations would generally be of the quantities and intensities of those occurring presently. While it should be noted that aircraft operations counts can and do fluctuate from year to year, it is anticipated that their level at any given time generally approximates current levels of activity modeled for the 2010 AICUZ study and this EA, approximately 35,500 annual operations. However, under the No Action Alternative, engine modifications for C-5 aircraft assigned to Dover AFB would still occur. Consequently, the size of the predicted noise exposure contours would shrink as discussed above in §4.2.2. A visual comparison of these differing sets of predicted noise exposure contours, as well as data concerning the reduction in the acreage embraced with an area of high predicted noise exposure, were presented in that section.

4.2.3.2 Construction Noise

Selection of the No Action Alternative would mean that the construction activities associated with the FTU beddown would not occur. Therefore, no change to the baseline noise environment would occur in this regard.

4.3 AICUZ and Land Use

4.3.1 Criteria of Significant Impact

A comparative methodology is used to determine impacts to land use and visual resources at Dover AFB. Flight operations, facility operations, and any construction or modification activities associated with each alternative were examined and compared to existing land use conditions and land use plans. Effects were identified as they related to changes in land ownership and use classifications, extent of changes, potential conflicting uses on and off the base, and accessibility concerns.

4.3.2 Proposed Action

4.3.2.1 Effects of Aircraft Operations on Existing Land Use Compatibility

In general, the principal effects from a change in aircraft operations (frequency, fleet mix, flight tracks and profiles) would be changes to the noise setting, thereby potentially altering land use compatibility as it relates to predicted noise exposure. A secondary potential effect to land use compatibility would arise if a change in aircraft operations would trigger a requirement to alter the configuration of the APZs that extend outward from the runway Clear Zones. Implementation of the Proposed Action includes the beddown of the FTU, construction of associated facilities, and increases in flight operations by the C-5M.

Clear Zones and Accident Potential Zones

As noted in §3.1 and §4.1 Airspace Use and Management, the increase in flight operations would not alter the manner in which flight operations would occur. In particular, the existing flight paths over the ground and air traffic control practices, procedures, and policies would remain as they currently are. Large cargo transport category aircraft would continue to be restricted from departing on Runway 14 over the City of Dover or from arriving on its reciprocal runway (32). Therefore, no change to the accident potential zones designations would be warranted and thus no change to the current degree of land use compatibility or incompatibility would occur as a result of increased flight operations associated with the C-5M FTU beddown.

Areas of Predicted Noise Exposure Greater than 65 dB(A) DNL from Aircraft Operations

As noted in §4.2 Noise, under the Proposed Action, C-5M flight operations would increase by 25% compared to both the baseline noise setting and the No Action Alternative; the effect that would have on the sizes, extents, and shapes of the noise contours is detailed there. As discussed

in §4.2 Noise, land use compatibility recommendations begin when predicted noise exposure levels exceed 65 dB(A) DNL. Implementing the Proposed Action would reduce the overall extent and size of predicted noise contours compared to baseline conditions. The area within the 65dB(A) or greater contour noise levels would shrink from 17,623 acres to 4,082 acres, reducing the number of people exposed to such noise levels from 2,767 to 763 persons contrasting off base population within DNL levels 65 dB(A) or greater under baseline, the Proposed Action, and the No Action Alternative. This would be beneficial, as formerly incompatible land uses would no longer lie within a noise contour having a value of greater than 65 dB(A) DNL. Below that threshold, no particular land use recommendation with respect to noise from aircraft operations is made by the DoD (Tables 4-4, 4-5, 4-6 and Figure 4-5).

Inasmuch as a diminution of the contours would occur, a detailed analysis of the interaction of the land use planning documents and zoning classifications of the surrounding jurisdictions is not undertaken. Both Kent County and the City of Dover have policy statements in their land use plans that recognize the importance of Dover AFB to the vitality of the community at large (Kent 2008; Dover 2009). In recognition of that, both jurisdictions have adopted policies to protect the installation from incompatible land uses to the extent feasible. Further, both jurisdictions' land use plans generally recommend compatible land uses for future growth and development while recognizing and respecting existing patterns of development. Additionally, to implement their land use plans, both jurisdictions have adopted zoning ordinances that explicitly recognize the classifications contained within the AICUZ study, and thus serve to prevent development of future land uses that would be incompatible by virtue of their location in areas having increased levels of exposure to aircraft noise or accident potential.

4.3.2.2 Effects of Facility Construction on Dover AFB Plans

The facilities identified in §2 to support the FTU activities would be located on a part of the installation that is the subject of the Main Administrative Headquarters Area Development Plan (ADP), a subsidiary detailed plan contained within the General Plan (Air Force 2010a) The generalized land use recommendation for this area of the base bounded on the east by Purple Heart Drive, on the south by Atlantic Avenue, on the west by Eagle Way, and on the north by Arnold Street is "Administrative". For land lying immediately north of Arnold Street, the recommendation is for land uses directly supporting Air Operations. The proposed

Table 4-4. Land Uses (Acreage) Underlying AICUZ Noise Zones (Proposed Action)

Land Use Classification	Acreage (Off Base)	Acreage (On Base)	Acreage Total
Commercial	**4.78**		**4.78**
65-69	4.78		4.78
Industrial	**348.54**	**24.30**	**372.84**
65-69	165.89	0.90	166.79
70-74	108.35	1.69	110.04
75-79	70.94	12.78	83.72
80+	3.36	8.92	12.28
Open/Ag/Low Density	**3,584.38**	**1.38**	**3,585.76**
65-69	2,684.51	0.89	2,685.40
70-74	742.66	0.49	743.15
75-79	150.67		150.67
80+	6.54		6.54
Public/Quasi-Public	**18.88**	**2,341.52**	**2,360.40**
65-69	6.12	581.01	587.14
70-74	12.76	589.34	602.10
75-79		615.33	615.33
80+		555.84	555.84
Recreational	**44.69**		**44.69**
65-69	35.32		35.32
70-74	9.37		9.37
Residential	**56.17**	**0.28**	**56.45**
65-69	56.17	0.28	56.45
Grand Total	**4,057.43**	**2,367.48**	**6,424.91**

redevelopment of the facilities in this area would be consistent with these recommendations. To assure maximum compatibility with the Main Headquarters ADP as well as the Mortuary Area ADP, the design of new facilities would need to consider the objectives of those ADPs. Existing procedures for construction approval on military installations call for such an examination.

Table 4-5. Proposed Action - Off Base Compatibility within Noise Contours

Category	DNL (dB)				CZ	APZ I	APZ II	Total
	65-69	70-74	75-79	80+				
Residential								
Compatible	0	0	0	0	0	0	0	**0**
Incompatible	49	0	0	0	0	4	1	**54**
Commercial								
Compatible	0	0	0	0	0	0	0	**0**
Incompatible	0	0	0	0	0	0	0	**0**
Public/Quasi-Public								
Compatible	0	0	0	0	0	0	0	**0**
Incompatible	6	13	0	0	0	0	0	**19**
Industrial								
Compatible	0	0	0	0	0	0	0	**0**
Incompatible	0	0	0	0	74	0	0	**74**
Open, Agriculture & Low Density								
Compatible	0	0	0	0	0	0	0	**0**
Incompatible	0	0	0	0	0	0	0	**0**
Recreational								
Compatible	0	0	0	0	0	0	0	**0**
Incompatible	0	0	0	0	0	0	0	**0**
Total	**55**	**13**	**0**	**0**	**74**	**4**	**1**	**147**

Notes: DNL = Day-Night Average A-weighted Sound Level; dB = decibel; CZ = Clear Zone; APZ = Accident Potential Zone

Table 4-6. Off Base Populations within DNL Noise Zones

DNL Noise Zone	Contour Acreage	Off Base Population
Baseline - Area & Population (Off Base)		
65-69 dB	9,585	1,962
70-74 dB	4,992	585
75-79 dB	2,082	172
80 + dB	964	48
Total	17,623	2,767
No Action - Area & Population (Off Base)		
65-69 dB	2,326	213
70-74 dB	690	37
75-79 dB	158	2
80 + dB	2	-
Total	3,176	252
Proposed Action - Area & Population (Off Base)		
65-69 dB	2,971	696
70-74 dB	879	64
75-79 dB	222	3
80 + dB	10	-
Total	4,082	763

Source: Baseline is calculated from the 2010 AICUZ study (Air Force 2010a) and USCB 2000a
Notes: DNL = Day-Night Average A-weighted Sound Level; dB = decibel

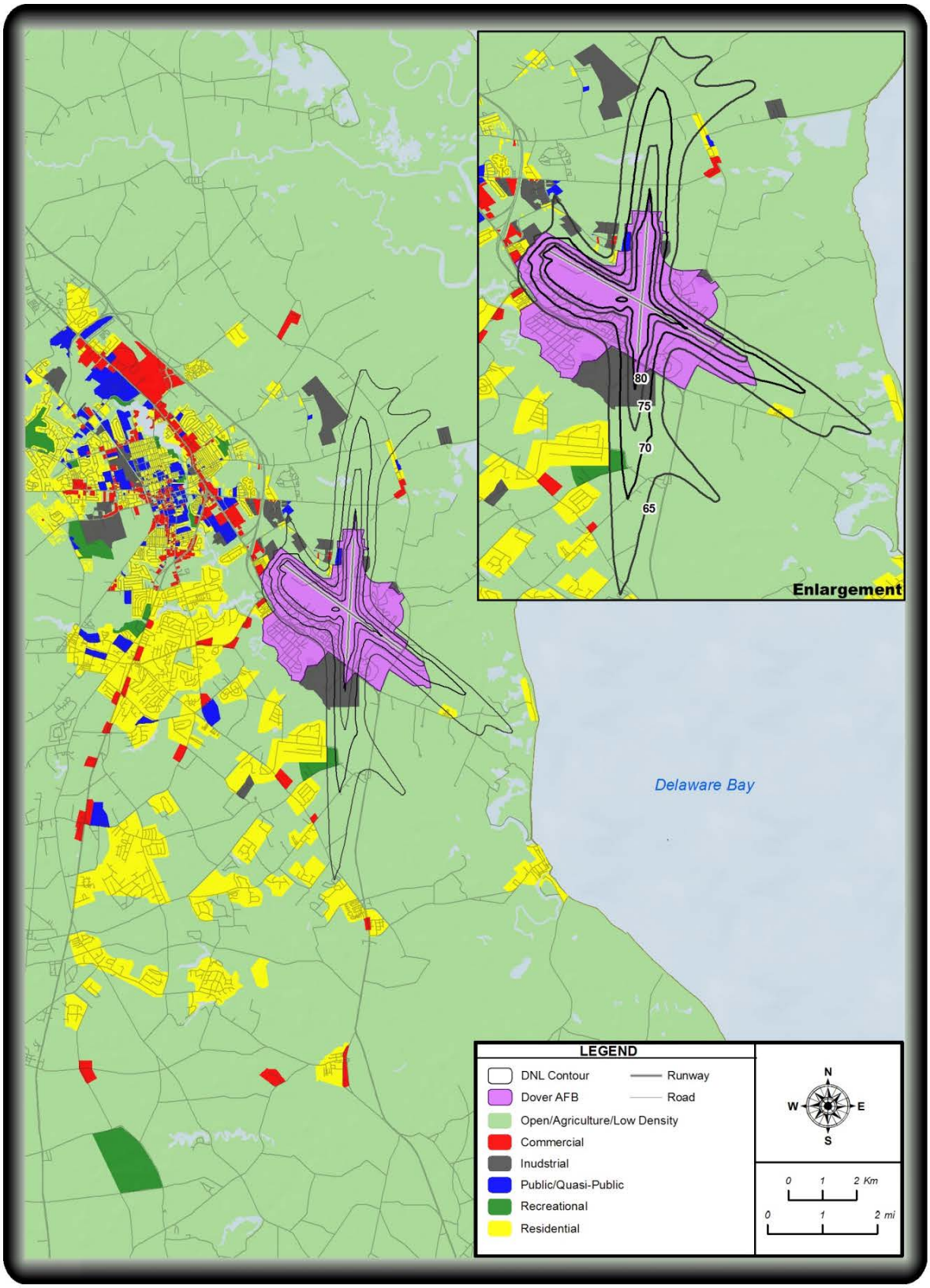


Figure 4-5. C-5M Proposed Action Land Use and Predicted Noise Exposure

4.3.3 No Action Alternative

4.3.3.1 Effects of Aircraft Operations on Existing Land Use Compatibility

As with the Proposed Action, the principal effects from a change in aircraft operations (frequency, fleet mix, flight tracks and profiles) would be changes to the noise setting which would alter land use compatibility as it relates to predicted noise exposure. A secondary potential effect to land use compatibility would arise if a change in aircraft operations would trigger a requirement to alter the configuration of the APZs that extend outward from the runway Clear Zones. Under the No Action Alternative the beddown of the FTU and construction of its associated facilities would not occur, nor would flight operations by the C-5M increase from baseline levels of activity. However, the planned modifications to the existing C-5A/B aircraft stationed at Dover would occur.

Clear Zones and Accident Potential Zones

No change to the existing policies and procedures governing aircraft operations would occur under this alternative. Therefore no change to the accident potential zones designations would be warranted, and thus no change to the current degree of land use compatibility or incompatibility would occur.

Areas of Predicted Noise Exposure Greater than 65 dB(A) DNL from Aircraft Operations

As noted in §4.2 Noise, under the No Action Alternative, flight operations would not increase compared to the baseline 2010 AICUZ study (Air Force 2010a), whereas the C-5 aircraft stationed at Dover would be modified with quieter, more fuel efficient engines of the C-5M, independent of the Proposed Action. The effect that would have on the sizes, extents, and shapes of the noise contours is detailed there. As discussed in §4.2 Noise, land use compatibility recommendations begin when predicted noise exposure levels exceed 65 dB(A) DNL. Under the No Action Alternative the overall extent and size of predicted noise contours would be reduced from the baseline noise setting. This change to the predicted noise exposure contour would beneficially change the land use compatibility, similar to the manner found under the Proposed Action (Tables 4-7 and 4-8; Figure 4-6). With the reduction in the overall size and extent of the contour, formerly incompatible land uses would no longer lie within a noise contour having a value of greater than 65 dB(A) DNL, and below that threshold, no particular land use recommendation with respect to noise from aircraft operations is made by the DoD.

Table 4-7. Land Uses (Acreage) Underlying AICUZ Noise Zones (No Action Alternative)

Sum of Acres			
	Off Base	**On Base**	**Grand Total**
Commercial	**0.83**		**0.83**
65-69	0.83		0.83
Industrial	**305.85**	**23.75**	**329.60**
65-69	148.17	0.47	148.64
70-74	99.58	2.56	102.14
75-79	57.33	18.44	75.76
80+	0.77	2.28	3.05
Open/Ag/Low Density	**2,762.66**	**1.30**	**2,763.96**
65-69	2,085.98	1.04	2,087.02
70-74	574.80	0.26	575.05
75-79	100.53		100.53
80+	1.35		1.35
Public/Quasi-Public	**18.88**	**2,246.48**	**2,265.36**
65-69	10.92	608.77	619.69
70-74	7.96	570.84	578.80
75-79		439.14	439.14
80+		627.72	627.72
Recreational	**36.94**		**36.94**
65-69	33.91		33.91
70-74	3.03		3.03
Residential	**30.75**	**0.06**	**30.81**
65-69	30.75	0.06	30.81
Grand Total	**3,155.91**	**2,271.58**	**5,427.49**

Table 4-8. No Action Alterative - Off Base Compatibility within Noise Contours

Category	DNL (dB)				CZ	APZ I	APZ II	Total
	65-69	70-74	75-79	80+				
Residential								
Compatible	0	0	0	0	0	0	0	**0**
Incompatible	29	0	0	0	0	1	0	**30**
Commercial								
Compatible	0	0	0	0	0	0	0	**0**
Incompatible	0	0	0	0	0	0	0	**0**
Public/Quasi-Public								
Compatible	0	0	0	0	0	0	0	**0**
Incompatible	11	8	0	0	0	0	0	**19**
Industrial								
Compatible	0	0	0	0	0	0	0	**0**
Incompatible	0	0	0	0	74	0	0	**74**
Open, Agriculture & Low Density								
Compatible	0	0	0	0	0	0	0	**0**
Incompatible	0	0	0	0	0	0	0	**0**
Recreational								
Compatible	0	0	0	0	0	0	0	**0**
Incompatible	0	0	0	0	0	0	0	**0**
Total	**40**	**8**	**0**	**0**	**74**	**1**	**0**	**123**

Notes: DNL = Day-Night Average A-weighted Sound Level; dB = decibel; CZ = Clear Zone; APZ = Accident Potential Zone

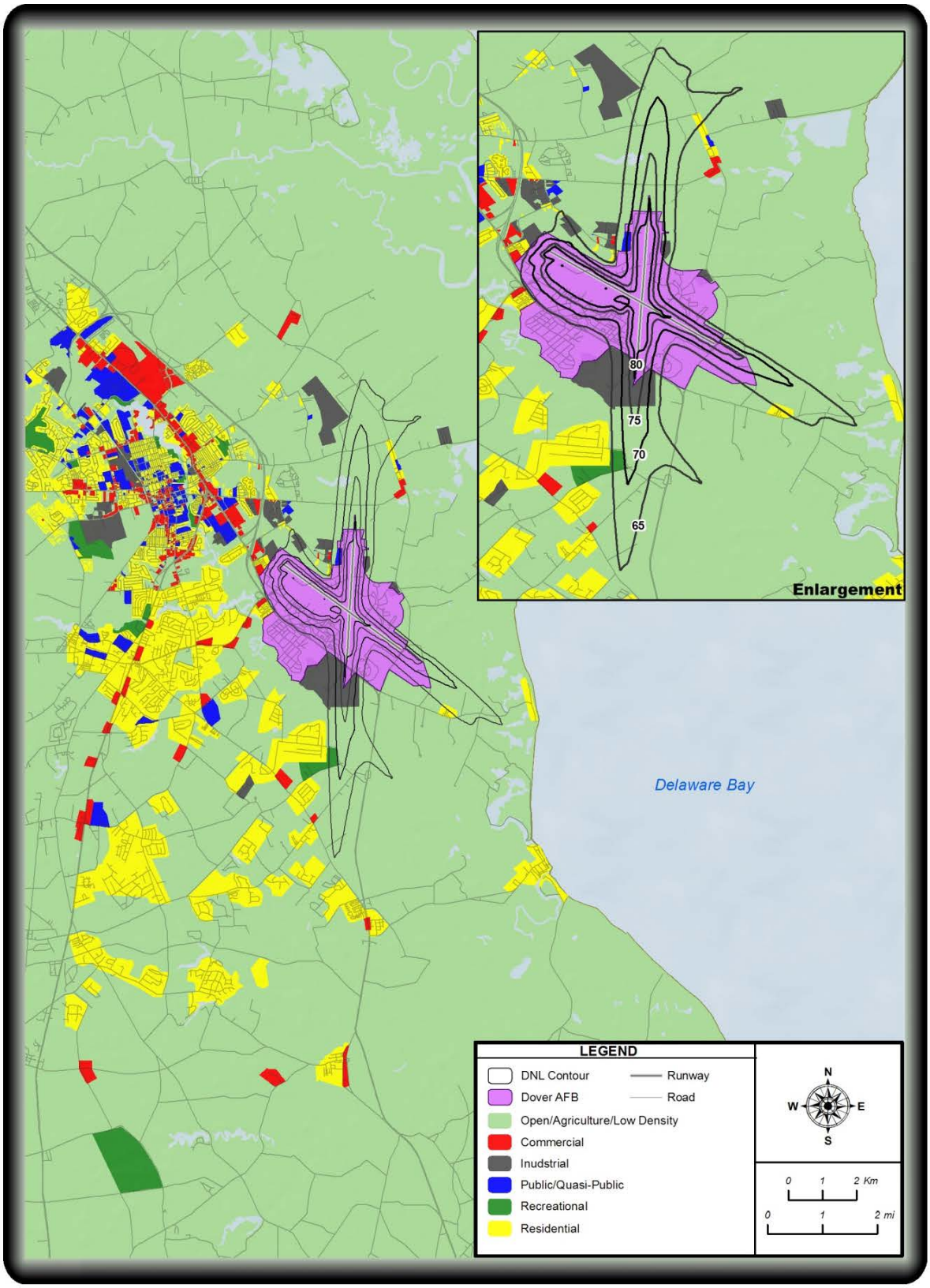


Figure 4-6. C-5M No Action Alternative Land Use and Predicted Noise Exposure

4.3.3.2 Effects of Facility Construction on Dover AFB Plans

Under the No Action Alternative, no facilities would be constructed to support beddown of a FTU. Therefore, no change to the baseline conditions on Dover AFB described in §3.3 Land Use would occur.

4.4 Air Quality

4.4.1 Criteria of Significant Impact

Impacts to air quality would be considered significant if project emissions exceeded the NAAQS, exceeded the *de minimis* exemption levels, or exposed sensitive receptors to increased pollutant concentrations.

4.4.2 Proposed Action

Implementation of the Proposed Action would not significantly alter the attainment status for Kent County or the Mid-Atlantic Region as defined by USEPA. Potential emissions for the ozone precursor pollutants, NO_x and VOC, are estimated for the General Conformity Rule applicability analysis.

Facility construction associated with beddown of the FTU would consist of making interior modifications to Building 206, construction of an approximately 6,000 square foot addition to Building 206, and use of temporary trailers during construction phases. Construction would be phased beginning in 2012 and completed by FQ4/2013. The proposed facility construction would result in minor increases in dust (PM_{10}) from disturbance to soils and increased combustion emissions (VOCs, CO, SO_2, and NO_x) from the use of construction equipment. The quantity of uncontrolled fugitive dust emissions from a construction site is proportional to the area of land being worked and the level of construction activity. Emissions from activities associated with site clearing, grading, and from vehicular traffic moving over the disturbed site would be greatest during the initial site preparation activities and would vary from day to day depending on the construction phase, level of activity, and prevailing weather conditions. A conservative estimate of PM_{10} emissions for construction and demolition activities provided by the USEPA is 1.2 tons/acre/month of activity (USEPA 1995). The active construction area would be approximately 0.16 acres and expected to last for up to 12 months, potentially generating 2.31 tons of PM_{10}. Watering exposed soil at the beginning and end of each day

according to BMPs would decrease the amount of fugitive dust released into the atmosphere from construction operations and trucks driving on unpaved surfaces by as much as 50%. Therefore, impacts from fugitive dust are expected to be minimal and temporary. Emissions from the proposed minor construction activities would be minimal, short-term, and well below *de minimis* values. The General Conformity Rule does not apply to the Proposed Action. The associated emissions from construction activities would be considered insubstantial and not affect the local air quality.

Airfield and training operations and ground support equipment associated with the proposed C-5M FTU beddown would generate emissions on a recurrent basis. Emissions for airfield and training operations of the C-5M FTU beddown have been determined by AFCEE utilizing Air Emission Inventory Guidance Document for Mobile Sources at Air Force Installations 2001, Air Emission Inventory Guidance Document for Mobile Sources at Air Force Installations 2010, and AFCEE Mobile 2010, and are presented in Appendix D.

A General Conformity Applicability analysis of emissions has been conducted by AFCEE based on the converted C-5M engine of the *Super Galaxy* and increased flights associated with the FTU, emissions from C-5A/B *Galaxy* aircraft that would continue to utilize the Dover AFB airfield until full conversion is realized, and ground support equipment for both aircraft types (Table 4-9). A Federal action would be considered regionally significant if the net change in emissions from the Proposed Action equal or exceed 10% of the nonattainment or maintenance area's emissions inventory for any criteria air pollutant. A full conformity determination is not required if a Federal action meets *de minimis* requirements and is not considered a regionally significant action. Ongoing activities currently being conducted are exempt from the rule so long as there is no increase in emissions equal to or greater than the *de minimis* thresholds as a result of the Federal action. As presented in Table 4-9, implementation of the Proposed Action would result in a substantial reduction in emissions from the existing condition baseline. This would be achieved despite the estimated 25% increase in the sorties associated with the C-5M FTU; the reduction in emissions would be due primarily to the cleaner converted engines of the C-5M *Super Galaxy*. Emissions would remain below *de minimis* levels that would require a CAA conformity determination.

Table 4-9. Proposed Action General Conformity Applicability Analysis

			Emissions (tons/year)			
	County	State	**NOx**	**CO**	**VOCs**	**PM**
County Emissions 2005	Kent	Delaware	8,335	3,8550	5,764	3,841
***De Minimis* Level**	Non-Attainment Area Moderate - Ozone		100	NA	100	NA
10% of Regional Emissions			834	3,855	576	384
Proposed Action Emissions	C-5A/B Aircraft Emissions		70.06	47.16	13.71	5.01
	C-5A/B Ground Support Equipment[1]		6.39	12.17	0.96	0.63
	C-5M Aircraft Emissions		42.26	41.25	8.34	0.87
	C-5M Ground Support Equipment[1]		6.39	12.17	0.96	0.63
Total Emissions	C-5A/B		76.45	59.32	14.68	5.64
	C-5M		48.66	53.42	9.30	1.49
Trigger *De Minimis* Level?	C-5A/B		No	NA	No	NA
	C-5M		No	NA	No	NA

Notes: NA= not applicable
[1]C-5A/B and C-5M share the same ground support equipment.

4.4.3 No Action Alternative

Implementing the No Action Alternative would not result in any changes to current air quality in the region. Emissions would continue to be generated by Dover AFB activities such as aircraft operations and other aircraft maintenance activities, as well as vehicle, boiler, generator, and fueling operations, and industrial processes. It is anticipated that emissions from these activities would continue at the levels generated under the baseline condition.

4.5 Water Quality

4.5.1 Criteria of Significant Impact

Impacts to water resources would be considered significant if implementation of the action resulted in changes to water quality or supply, threatened or damaged unique hydrologic characteristics, or violated established laws or regulations.

4.5.2 Proposed Action

Implementation of the Proposed Action could result in minor impacts to water quality from surface water runoff following storm events during construction activities for FTU facilities; however, a sediment and erosion control plan would be developed and implemented during construction, minimizing any potential impacts to nearby surface water features (e.g., erosion, siltation) that could result from construction and demolition activities. Methods include using erosion control fencing, straw bales, or similar practices. The potential short-term impacts to water quality during construction activities would cease upon completion of the project. Moreover, implementing this alternative would not impact the groundwater table since construction activities are not expected to reach the depth to groundwater. In the event groundwater is encountered during construction, appropriate remediation of the extracted groundwater would be required and would reduce the potential for the release of contaminated water. No substantial negative impacts would occur from the implementation of the Proposed Action.

4.5.3 No Action Alternative

Implementing the No Action Alternative would cause no change to the water quality at Dover AFB. The proposed construction activities would not occur; therefore, no impacts would occur to water quality in the project site.

4.6 Soil Resources

4.6.1 Criteria of Significant Impact

Significant impacts to soils would occur if implementation of an action resulted in permanently increasing erosion and sedimentation of nearby water bodies, or affected unique soil conditions.

4.6.2 Proposed Action

Implementation of the Proposed Action would not significantly negatively impact soil resources on Dover AFB. Soils in the area of proposed FTU facility development have been previously disturbed in their entirety from construction in this highly urbanized setting of Dover AFB. Soils would be temporarily disturbed at the location associated with the proposed construction activities. However, erosion and sedimentation control measures such as silt fences, straw bales, sediment traps, and application of water sprays to freshly disturbed soil would be implemented to

minimize impacts to soils, and the potential increase in erosion and sedimentation. In addition, stockpiling topsoil for re-use would be implemented to preserve soil quality and sustain re-established vegetation. Potential compaction of soil from construction activities would be minimized by employing BMPs for heavy equipment use, such as utilizing designated access routes and limiting operations in wet conditions.

While the proposed location for facility construction is within 500 feet of an ERP site, disturbance or transportation of potentially contaminated soils is not expected to occur. In accordance with AFI 32-7020, *The Environmental Restoration Program*, if contaminated soils are found on the proposed construction site, cleanup and site preparation would be required. The specific actions required in the event contaminated soils are found within the construction site are discussed in greater detail in §4.7, Hazardous Materials and Wastes. Only temporary and minor impacts to soils would be expected as a result of implementation of the Proposed Action.

4.6.3 No Action Alternative

Under the No Action Alternative, the proposed construction activities would not occur and the conditions affecting soil resources at Dover AFB would remain the same. No significant negative impact to soil resources would occur.

4.7 Hazardous Materials and Wastes

4.7.1 Criteria of Significant Impact

Significant impacts to hazardous materials and wastes management at Dover AFB would occur if activities resulted in a release of these materials into the environment. Potential releases to the air, water or soil that exceed Federal and state guidance would be considered significant.

4.7.2 Proposed Action

Implementation of the Proposed Action could disturb and/or generate hazardous wastes, consume hazardous materials, and/or disturb known hazardous materials sites (i.e., ERP ST05) in the vicinity of Building 206. The potential impacts would be short-term, ending with completion of construction activities, currently estimated to be December 2013. Hazardous materials used for construction activities would likely include fuels, paints, glues, and asphalt materials. Most of these materials would typically be consumed in their entirety and very little waste generated

for disposal. As a result, no large amounts of construction-related hazardous materials would be expected, and any hazardous wastes generated during the activities would be disposed of in accordance with applicable Federal, state, and local regulations. No long-term effects would be expected because use of hazardous materials and generation of hazardous wastes would cease after construction activities.

As the proposed construction site is within 500 feet of ERP ST05, some short-term, minor effects from possible contamination by the ERP site may occur. Although no contaminants are thought to be in the project area, if contamination is encountered, it would be handled, stored, transported, remediated and disposed of in accordance with Air Force regulations, Dover AFB's Management Action Plan, and applicable Federal, state, and local regulations. Any excavated soils from the proposed construction of the FTU suspected of contamination would either be reused on the site, or would be stockpiled on site, tested for contamination, and properly disposed of at an approved off-site facility. Potential minor impacts would be short term, and end upon completion of construction activities. No negative long-term effects would be expected.

The number of aircraft operations would increase by approximately 8.9% annually, increasing the use of hazardous materials such as petroleum products, cleaning solvents, and paints. However, compliance with existing Federal and Air Force regulations would minimize the potential for the release of these materials into the environment, and no substantive negative effect would be expected.

4.7.3 No Action Alternative

Implementing the No Action Alternative would result in no effects from hazardous materials or substances since no construction activities would occur. Existing levels of hazardous materials or wastes from ongoing operations would be maintained and disposed of in accordance with appropriate regulations.

4.8 Socioeconomic Resources and Environmental Justice

4.8.1 Criteria of Significant Impact

Socioeconomic resources would be impacted if an action resulted in a change to the population, employment, or income potential in the ROI. Environmental justice is achieved when everyone,

regardless of race, culture, or income, enjoys the same degree of protection from environmental and health hazards and has equal access to the decision-making process. Significant environmental justice impacts would result if access to decision-making documents were denied or if any adverse environmental or health effects occurred from an action that would disproportionately and highly adversely affect minority or low-income populations.

4.8.2 Proposed Action

Implementing the Proposed Action would not create significant effects on demographics, income or employment within the ROI. The proposed construction activities would result in a slight, temporary increase in economic activity. Costs for the proposed building rehabilitation and construction activities are estimated at $3.2 million, which is less than a 0.7% increase over the estimated annual $470 million economic impact Dover AFB has on Delaware's economy. Construction activities would be short term, with an estimated completion of December 2013. In a local economy that generates approximately $4.5 billion annually, the project cost and associated spin-off and economic activity multiplier effects would not be significant. The FTU would employ 5 Instructor Pilots and 5 Instructor Flight Engineers who would train approximately 24 temporarily assigned students every 3 months; as such there is no potential for a significant impact to demographics.

The construction would not require the relocation of any residents or commercial enterprises. Community real estate and sales taxes would not be altered appreciably; Dover AFB is Federally owned, and as such is exempt from state and local taxation. However, since construction materials are taxed, a negligible increase would occur for the taxing jurisdiction.

Since there would be no substantial adverse impacts to demographics, income or employment under the Proposed Action, there would be no disproportionately highly adverse impacts to minority or low-income populations. As previously discussed, training flights for the C-5 would increase by 25%; however, the 3 census tracts within the ROI classified as poverty areas are outside of the DNL determined to account for increased annoyance. There would be no environmental justice concerns from the implementation of this alternative.

4.8.3 No Action Alternative

Implementing the No Action Alternative would not change the population growth rate, employment opportunities, or the income potential within the ROI. Similarly, there would be no effects on the social or economic characteristics in the ROI. Under the No Action Alternative, the beddown of the C-5M FTU would not occur at Dover AFB. Subsequently, there would be no rehabilitation or construction of administrative or training facilities at Dover AFB that could generate socioeconomic or environmental justice impacts.

4.9 Safety

4.9.1 Criteria of Significant Impact

An impact to human health and safety would be significant if an action creates unacceptable safety conditions, impacts potential exposure to hazardous materials/wastes/substances or emergency response capability, or substantially changes safety or health risks beyond existing management or response plans.

4.9.2 Proposed Action

Under the Proposed Action, beddown of the C-5M FTU has the potential to generate effects on human health and safety due to activities associated with the alteration of existing buildings and construction of additional classroom and administrative space, as well as the day-to-day operation of these facilities. Likewise, increased air operations may increase the potential for impacts to aviation safety.

4.9.2.1 Occupational Safety and Health

Construction and renovation activities have inherent risks such as falls, electrocution, collisions with equipment, etc. Similarly, day-to day operations of these facilities also come with some specific risks to human safety. Implementing the Proposed Action is not expected to result in substantive negative impacts to safety, as construction and renovation would comply with requirements outlined in OSHA Occupational Safety and Health Standards 29 CFR §1910 (General Industry) and §1926 (Construction), as well as industrial hygiene directives. Likewise, day-to-day operations of FTU facilities would not have severe negative effects to safety since the requirements specified in AFI 91-301, *Air Force Occupational and Environmental Safety, Fire*

Protection, and Health Program, and Air Force industrial hygiene programs are implemented with any Air Force activity.

4.9.2.2 Aviation Safety

Impacts to safety could occur if an action: (a) replaces an aircraft type with another type having a higher accident potential; (b) results in construction that is an obstacle to air navigation; or (c) creates an attractive environment for avian species and increases the BASH potential.

Airfield Safety

The airport's runways, taxiways, aircraft parking areas, navigational aids, lighting systems, signage, and markings are currently designed to support based assigned and transient operations at Dover AFB. Under the Proposed Action, the number of C-5 aircraft assigned to Dover AFB would not increase. However, the number of C-5 aircraft operations would increase by 25% annually, consisting primarily of a morning and a night training flight 5 days a week. This relatively low level of activity would be accommodated by existing airfield operations and would not substantially increase airfield safety risks

Emergency Response

The flight activities of the C-5M would not be appreciably different from current operations; with the exception of the 25% increase in C-5 operations resulting from the FTU beddown. Consequently, the beddown action would generate a potential increased exposure of risk which could result in emergency response actions; however, existing airfield and airspace use and management procedures would minimize the conditions that may lead to accidents. ARFF would continue to maintain the capacity to manage emergencies with existing emergency response management plans.

Wildlife Management

The proposed construction activities for the FTU beddown would not increase the attractiveness of the area for bird or other wildlife habitat. Although C-5 air operations would increase approximately 25% under the Proposed Action and thus would potentially increase exposure of aircraft to bird/wildlife aircraft strike, continued implementation of the Dover AFB BASH Plan would minimize conditions giving rise to incidents involving birds and wildlife.

Obstacle Evaluation

As part of the site review and approval process, proposed construction activities are examined to determine whether they would create obstacles to air navigation. The criteria for permissible construction would be met by observing stipulated building setback lines from the Part 77 surface areas and limiting the height of buildings to those permitted by the provisions of Part 77. Therefore, construction of the C-5M FTU facilities would not result in an obstacle to air navigation.

Flight Safety

The proposed C-5M FTU beddown does not replace the aircraft type assigned at Dover AFB, but the Air Force plans to make over 70 improvements to the aging C-5 *Galaxy* aircraft, which are deficient in terms of avionics, fuel consumption, noise, and reliability. These modifications and the upgraded C-5M engines have improved the safe operation of the aircraft. Eighteen C-5M *Super Galaxy* aircraft are scheduled to be based at Dover AFB, improving overall flight safety at the installation. Beddown of the C-5M FTU at Dover AFB serves to improve flight safety by training pilots and air crew in their new operational properties and maintenance requirements.

System Safety

The C-5 aircraft currently assigned to Dover AFB are in the operational phase of the system life cycle. The aging C-5 *Galaxy* aircraft are currently being upgraded to improve their avionics, fuel consumption, noise, and reliability, Beddown of the C-5M FTU at Dover AFB would improve the systems safety of the aircraft through improved operability by trained pilots and air crew.

4.9.3 No Action Alternative

4.9.3.1 Occupational Safety and Health

Under the No Action Alternative, the beddown of the C-5M FTU at Dover AFB would not occur. The proposed construction of facilities and training activities would not occur, thus no changes to safety would ensue.

4.9.3.2 Aviation Safety

Airport Safety

If the C-5M FTU were not beddown at Dover AFB, no associated modifications to the airfield operations would occur; therefore, the airfield would continue to operate under current safety standards and procedures.

Emergency Response

Under the No Action Alternative, current ARFF procedures governing emergency response would remain in force and adequately protect life and property.

Wildlife Management

If the C-5M FTU beddown did not occur, conditions affecting the attractiveness of bird or wildlife habitat around the airfield would not change. Therefore, no change in bird/wildlife strike hazard conditions would occur.

Obstacle Evaluation

Implementation of the No Action Alternative would not change the current conditions of the airfield. This would lead to no change in the Part 77 surface areas for Dover AFB or change conditions concerning potential obstacles to air safety.

Flight Safety

Implementation of the No Action Alternative would not change the number of annual sorties. As a result, no changes to flight safety would occur.

System Safety

The C-5 receiving engine modifications, extending its system lifecycle, would continue to occur even if the C-5M FTU was not beddown at Dover AFB. Similarly, training of pilots and air crew in operating the C-5M *Super Galaxy* aircraft would occur at some other installation, ensuring system safety is achieved for the modified aircraft. No negative impact to system safety would occur from implementation of the No Action Alternative.

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5.0 CUMULATIVE EFFECTS

5.1 Introduction

The CEQ regulations stipulate that the cumulative effects analysis within an EA should consider the potential environmental impacts resulting from the incremental impacts of the action when added to other past, present and reasonably foreseeable actions regardless of what agency or person undertakes such other actions. The CEQ guidance in considering Cumulative Effects affirms this requirement, stating that the first steps in assessing cumulative effects involve defining the scope of the other actions and their interrelationship with the Proposed Action. The scope must consider geographic and temporal overlaps that the Proposed Action would have with other programs or projects. A cumulative effects analysis must also evaluate the nature of interactions among these actions.

Cumulative effects most likely arise when a relationship exists between a Proposed Action and other actions expected to occur in a similar location or during a similar time period. Actions overlapping with or in proximity to the Proposed Action would be expected to have more potential for a relationship than those more geographically separated. Similarly, actions that coincide, even partially, in time tend to have potential for cumulative effects.

5.2 Past, Present, and Reasonably Foreseeable Actions

In this EA, the affected environment for consideration of direct and indirect impacts includes completed and planned renovation, demolition and construction projects on Dover AFB. These projects include 26 MILCON projects, 23 major Operations and Maintenance (O&M) projects, and 17 C-17 Facility Improvement programs (Appendix E) (Dover AFB 2008). Two of these projects are within the APE of the Proposed Action: the recently completed C-17 Flight Simulator (Building 208) and the planned Consolidated Wing Headquarters listed in the 2008 Dover AFB General Plan. An additional project that is most proximate in both time and geography is the construction of the 16,300 square foot Maintenance Training Facility (MTF) for which a Categorical Exclusion (CATEX) was issued in 2008. For the purposes of this analysis recently completed, proposed, and near future actions of the DoD or Air Force that potentially affect environmental resources are the primary sources of information used in identifying past, present, and reasonably foreseeable actions.

Past, present, and reasonably foreseeable actions are considered generally for each resource included within §4.0 of this EA and are presented in Table 5-1.

5.2.1 Cumulative Effects

Due to limited amount of land on Dover AFB that is developable and existing safety and environmental constraints, development of the base is occurring for the most part through selective renovation of existing structures, demolition and redevelopment of existing sites, and the consolidation of like functions (Dover AFB 2008). Moreover, new construction, where feasible, will be done vertically and will contain mixed-use activities. The 2007 Installation Development Environmental Assessment (IDEA) at Dover AFB analyzed the potential impacts of 9 representative projects planned to occur from FY 2008 through 2011; no long-term significant impacts were expected to occur as a result of these actions (Dover AFB 2007). Further, when these actions were compared to other projects in which an EIAP had been completed, no significant cumulative effects on resources were expected. As such, the incremental contribution of impacts of the Proposed Action, when considered in combination with other past, present, and reasonably foreseeable actions, are not expected to have significant long-term negative impacts to any of the resource areas analyzed. Short-term, negative direct impacts to air, water and soil resources may occur during the construction of the additional administrative space. Table 5-1 summarizes the cumulative effects for the resource areas analyzed.

The Air Force's primary airlift capability resides at Dover AFB. It is reasonably foreseeable that future military actions or responses to disasters could change force structure and air operations at Dover AFB. Any future development for new infrastructure improvements or substantial changes to air operations and potential effects on land use, noise, safety and other resources as applies would be assessed as required by NEPA, and the results provided to decision makers prior to undertaking a decision.

5.3 Irreversible and Irretrievable Commitment of Resources

NEPA requires that environmental analysis include identification of any irreversible and irretrievable commitments of resources which would be involved in the Proposed Action should it be implemented. Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the use of these resources has on future generations.

Irreversible effects primarily result from the use or destruction of a specific resource that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action. For the Proposed Action, no irreversible or irretrievable resource commitments would result.

Table 5-1. Cumulative Effects Matrix

Resource	Past and Present Actions	Proposed Action	Future Actions	Cumulative Effects
Airspace Use and Management	Past and present actions would continue to have no significantly negative effect on airspace use and management. Existing airspace classifications and training airspace would remain the same and effectively controlled for continued safety and operation of the Dover AFB airfield.	No significant effect on airspace use and management would occur under the Proposed Action. While air operations would increase slightly at Dover AFB, the Proposed Action would not: restrict movement of other air traffic in the area; create conflicts with air traffic control in the region; change operations within airspace already designated for other purposes; result in a need to designate controlled airspace where none previously existed; result in a reclassification of controlled airspace from a less restrictive to a more restrictive classification; or result in a need to designate regulatory special use airspace.	Future actions with potential to affect airspace use and management would not have significant adverse effects to this resource assuming applicable regulations are met and their implementation would not compromise the mission of the airfield at Dover AFB.	The Proposed Action along with past, present and future actions potentially affecting airspace use and management would have no significant cumulative negative impact to airspace use and management as adherence to standard scheduling and air traffic control procedures would continue to de-conflict aircraft in the long term.
Noise	Past and present actions would have no long-term, significant negative impacts to sensitive noise receptors. Present construction-related noise at Dover AFB would typically occur during daytime hours, be temporary,	Under the Proposed Action, aircraft related noise levels at Dover AFB would decrease in comparison to present estimated conditions, and would increase slightly compared to the No Action Alternative. That increase	Similar to that described for past and present actions, no long-term, significant negative impacts are expected from future actions having a potential to affect the noise setting when considered in conjunction with noise	The Proposed Action, in combination with past, present, and foreseeable actions, would not likely result in significantly negative impacts from noise.

Table 5-1. Cumulative Effects Matrix (cont'd)

Resource	Past and Present Actions	Proposed Action	Future Actions	Cumulative Effects
Noise (cont'd)	and cease upon individual project completion. Current operation of C-5M *Super Galaxy* aircraft at Dover AFB are estimated to generate noise levels lower than that recently estimated based on flying the older unmodified C-5 *Galaxy* aircraft.	would be undetectable by most sensitive receptors. Similar to past and present conditions, construction generated noise under the Proposed Action would be temporary, occur during daytime, and cease upon completion of facilities.	created by the construction activities or aircraft operations outlined in the Proposed Action. Modification of additional C-5 aircraft with improved, quieter engines may result in a reduction in acreage and persons exposed to high levels of noise and in the number of sensitive receptors.	
AICUZ/Land Use	Past and Present Actions would have no long-term significant negative impacts. There would be no changes to flightpaths over ground, or to air traffic practices, procedures, and policies; as such established Clear and Accident Potential Zones would remain unchanged. Because some quieter C-5M *Super Galaxy* aircraft currently operate out of Dover AFB, the 65 dB(A) and above noise contours would be reduced from baseline conditions, reducing the area within 65 dB(A) and above noise contours from 17,623 baseline acres to 3,176	Under the Proposed Action, C-5 flight operations would increase by 25%, yet the existing flight paths over ground and air traffic control practices, procedures, and policies would remain the same. Therefore, there would be no changes to established Clear or Accident Potential Zones. While C-5 operations would increase by 25%, because of the newer engines on the C-5M *Super Galaxy* aircraft, the area within 65 dB(A) and above noise contours would be reduced from the baseline 17,623 acres to 4,082 acres and subsequently shrinking the	Similar to that described for past and present actions, no long-term, significant negative impacts are expected from future actions having a potential to affect land use compatibility when considered in conjunction with aircraft operations outlined in the Proposed Action. Modification of additional C-5 aircraft with improved, quieter engines would result in a reduction in the amount of incompatible land use.	The Proposed Action, in combination with past, present, and foreseeable actions, would not likely result in significantly negative impacts to land use compatibility.

Table 5-1. Cumulative Effects Matrix (cont'd)

Resource	Past and Present Actions	Proposed Action	Future Actions	Cumulative Effects
AICUZ/Land Use (cont'd)	acres, lowering incompatible land use from 834 to 127 acres.	incompatible land use from 834 baseline acres to 147 acres. This would be slightly less beneficial than Present Actions due to the increased operations of the proposed FTU training flights.		
Air Quality	There would be no long-term, significant negative impacts associated with past and present actions. Facility demolition and construction activities would result in minor increases in dust due to soil disturbance and increased combustion emissions from construction equipment. These impacts would be minimized through the use of BMPs such as watering exposed soil to reduce fugitive dust; likewise, emissions from construction activities would be minimal, temporary, and below *de minimis* thresholds. Past and present airfield and training operations and aerospace ground equipment associated with assigned aircraft routinely generate emissions. These activities	Construction activities under the Proposed Action would result in dust and emissions similar to that described for past and present actions. These impacts would not be significant and would be minimized using the same BMPs as those outlined under past and present actions. Airfield and training operations, as well as from aerospace ground equipment associated with the Proposed Action, would result in a substantial reduction in emissions from that of past and present actions as a result of the cleaner engines of the C-5M. These reductions are achieved despite a 25% increase in the C-5 air operations tempo associated with the Proposed Action.	Similar to that described for past and present actions, no long-term, significant negative impacts to air quality are expected from future renovation or construction activities. Continued installation improvement projects are likely to have potential impacts similar to those described in past and present actions. Future actions, similar to those described for in present actions, or modification of additional C-5 aircraft with the improved, cleaner engines may result in further reductions of emissions associated with airfield and training operations, and associated aerospace ground equipment.	The Proposed Action along with past, present and future actions associated with construction activities could result in short-term, localized impacts to air quality, yet no long-term, significant negative impacts are expected. Positive, long-term direct and indirect cumulative impacts to air quality are expected to result from the Proposed Action, when considered in conjunction with past, present, and future actions.

Table 5-1. Cumulative Effects Matrix (cont'd)

Resource	Past and Present Actions	Proposed Action	Future Actions	Cumulative Effects
Air Quality (cont'd)	are below the *de minimis* thresholds that require a Federal CAA conformity determination.			
Water Quality	Past and present actions would have no long-term, significant negative impacts to water resources. Short-term, localized adverse impacts associated with ground disturbance may occur during construction activities. These impacts would be minimized through the use of erosion and sedimentation control measures.	Similar to past and present actions, no long-term significant negative impacts to water resources would occur under the Proposed Action. Impacts would be short-term, minimized by BMPs for erosion control and stormwater management, and cease when construction is completed.	It is expected future development on Dover AFB would minimize potential impacts to water resources through avoidance and employment of BMPs to control sedimentation and pollutant loading of nearby surface waters. No long-term significant negative impacts to water resources would occur if compliance with applicable laws and regulations were maintained.	The Proposed Action along with past, present and future actions associated with construction activities could result in short-term, localized impacts to water resources, yet no long-term, significant negative impacts are expected.
Soil Resources	Past and present actions would have no long-term, significant negative impacts to soil resources. Short-term, localized adverse impacts associated with ground disturbance may occur during construction activities. These impacts would be minimized through the use of erosion and sedimentation control measures and BMPs for heavy equipment use.	No long-term significant negative impacts to soil resources are expected under the Proposed Action. Potential impacts are similar to those described for past and present actions.	Similar to that described for past and present actions, no long-term, significant negative impacts are expected from future renovation or construction activities. Continued installation improvement projects are likely to have potential impacts similar to those described in past and present actions.	The Proposed Action along with past, present and future actions could result in short-term, localized impacts to soil resources, yet no long-term, significant negative impacts are expected.

Table 5-1. Cumulative Effects Matrix (cont'd)

Resource	Past and Present Actions	Proposed Action	Future Actions	Cumulative Effects
Hazardous Materials and Wastes	Past and present actions would have no long-term, significant negative impacts to hazardous materials and wastes. Environmental remediation actions in the last decade have substantially cleaned and contained past hazardous waste and material contamination; active management of known contaminated sites at Dover AFB continues. Compliance with regulations and directives governing hazardous material and waste handling, storage, use, and disposal minimize potential for human or environmental exposure to unsafe conditions.	No significant negative impacts involving hazardous waste or substances would occur from implementation of the Proposed Action. Similar to past and present conditions, existing Air Force regulations and procedures for handling, storing, and disposing of hazardous waste and material potentially encountered from construction and operation of the C-5M FTU at Dover AFB would maintain a safe environment.	Similar to that described for past and present actions, no long-term, significant negative impacts are expected from future actions with potential to affect or generate hazardous materials or waste if existing Federal, state, and local laws, regulations, and procedures governing the safe handling, storage, and disposal of hazardous materials or waste are observed. Continued management of past contaminated sites located at Dover AFB would have positive long-term benefits for the human and natural environment.	The Proposed Action combined with past, present and future actions would not result in any significantly negative impacts from hazardous materials or wastes.
Socioeconomic Resources and Environmental Justice	Past and present actions that increase employment opportunities and the purchase of materials through current renovation and construction projects positively impact local economics.	Slight beneficial impacts would be expected from expenditures associated with the Proposed Action. There would be no significant impact to demographics, income or employment from the Proposed Action; therefore no disproportionate impacts to minority or low-income populations would	Continued improvement projects are likely to have impacts similar to those described in past and present actions.	Positive, long-term direct and indirect cumulative impacts to local economics are expected to result from the Proposed Action, along with past, present, and future actions.

Table 5-1. Cumulative Effects Matrix (cont'd)

Resource	Past and Present Actions	Proposed Action	Future Actions	Cumulative Effects
Socioeconomic Resources and Environmental Justice (cont'd)		occur. Similarly, no disproportionate impacts to poverty areas within the ROI are expected from the increase in flights		
Safety	Past and present actions with potential occupational safety and health impacts from construction or operation of facilities at Dover AFB have no significantly negative impact to safety. Enforcement of Federal and Air Force occupational health and safety regulations, directives, and instructions minimize the potential for unsafe working or living conditions at the installation as they apply to any Air Force activity. Similarly, no significant negative impacts to aviation safety from present actions are expected. Current airfield conditions are adequate to support based assigned and transient aircraft operations at Dover AFB. Potential obstacles to airfield operations are identified and controlled through established review procedures and specific criteria. Present plans	The Proposed Action would not result in significantly negative impacts for occupational safety and health for the construction or operation of C-5M FTU facilities. It is expected that all measures would be taken to comply with Federal, State, and local ordinances and all Air Force directives and instructions to ensure a safe working and living environment at Dover AFB. Although airfield operations would increase, similar to the reasons provided for past and present actions, aviation safety would be maintained by observance of existing policies, plans, and instructions designed to ensure safe operation of the airfield. Overall safety would be enhanced under the Proposed Action by training pilots and aircrews in the proper operation and	Similar to that described for past and present actions, no long-term, significant negative impacts are expected from future actions with potential to affect occupational health and safety or aviation safety at Dover AFB. If the Proposed Action would not occur, the FTU mission would be placed at some other installation. Pilots and aircrew would still be trained in proper operation and maintenance of the C-5M *Super Galaxy*, maintaining aviation safety wherever the fleet flies.	Positive long-term impacts to aviation safety would occur under the Proposed Action, in combination with past, present, and foreseeable actions.

Table 5-1. Cumulative Effects Matrix (cont'd)

Resource	Past and Present Actions	Proposed Action	Future Actions	Cumulative Effects
Safety (cont'd)	to convert aged C-5 aircraft to the C-5M *Super Galaxy* with improvements to avionics, fuel consumption, reduced noise and enhanced reliability would improve flight safety and enhance the life system safety of the fleet. Existing airfield operations and construction activity have been coordinated to ensure no impact to emergency response would occur. Potential conflicts of aircraft with wildlife at the Dover AFB airfield are minimized by management that reduces attractive habitat, especially for birds, in sensitive areas and avoids flight during periods of high risk for encountering birds.	maintenance of the C-5M *Super Galaxy*, allowing introduction into the Air Force inventory of an aircraft widely expected to be more reliable and safer than its predecessor version.		

6.0 MITIGATION MEASURES

6.1 Introduction

The purpose of mitigation is to reduce or eliminate potential negative impacts of an action on affected resources. CEQ regulations (40 CFR §1508.20) state that mitigation includes:

- Avoiding the impact altogether by not taking a certain action or parts of an action;
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation;
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and
- Compensating for the impact by replacing or providing substitute resources or environments.

6.2 Roles and Responsibilities

Regulations established by CEQ state that all relevant reasonable mitigation measures that could alleviate the environmental effects of an action must be identified, even if they are outside the jurisdiction of the lead agency or the cooperating agencies. This serves to alert agencies or officials who can implement these extra measures, and will encourage them to do so. The lead agency for the alternatives analyzed is the Department of the Air Force.

6.3 Mitigation Recommendations

The majority of negative impacts associated with implementation of the Proposed Action are expected to be temporary and localized in nature, and they would occur primarily during preparation of the land for FTU facility construction. Activities may result in temporary localized impacts to air, noise, water, soil, and hazardous materials and waste. General procedures such as adherence to safety requirements, industrial hygiene, and noise attenuation measures that are always in affect would mitigate impacts that may occur as a result of the Proposed Action, but are not specific to the action. Specific minimization or mitigation measures are presented below by applicable resource area.

6.3.1 Air Quality

Activities associated with site clearing, grading, and from vehicular traffic moving over the disturbed site could increase emissions and would be greatest during initial site preparation

activities and would vary from day to day depending on the construction phase, level of activity, and prevailing weather conditions. The use of BMPs such as watering exposed soil at the beginning and end of each day would decrease the amount of fugitive dust released into the atmosphere from construction operations and trucks driving on unpaved surfaces by as much as 50%. Emissions and impacts from the proposed minor construction activities would be minimal, short-term, and well below *de minimis* values.

6.3.2 Noise

The Air Force engages in a program of extensive outreach to local communities to facilitate land-use planning to foster the establishment of compatible uses in the vicinity of its installations. The AICUZ program at Dover AFB is an ongoing process. An ongoing technique for mitigating aircraft noise is the designation of preferred runways to minimize operations over noise sensitive areas, weather conditions and flight safety permitting. For example, large aircraft avoid landings from the northwest on Runway 14 and when taking off from its reciprocal runway (32) turn as soon as practicable to the north to avoid overflying the city of Dover.

Though the effects from construction noise are considered minimal, there are several BMPs that can be employed to further reduce the effect on residential areas. One BMP is to restrict the operation of extremely noisy equipment (e.g., brick cutters or jackhammers) from operating before 0900 hours or after 1700 hours. Other BMPs to reduce construction-associated noise include utilizing properly operating and maintained equipment (e.g., possessing mufflers, gaskets, sharpened and lubricated blades), maximizing the distance of loud equipment from a residence, directing equipment to use less noise-sensitive routes, fitting silencers to combustion engines, fastening machinery covers or panels tightly, isolating vibrating parts/damping, constructing sound barriers to reduce propagation, or shutting off/idling machinery between work periods (Eaton 2000; Suter 2002; Tempest 1985).

6.3.3 Water Resources

The Proposed Action could result in minor impacts to water quality from surface water runoff following storm events during construction activities; however, a sediment and erosion control plan would be developed and implemented during construction, minimizing any potential siltation and pollutant effects to nearby surface water features that could result from construction

and demolition activities. Methods include using erosion control fencing, straw bales, or similar practices. The potential short-term impacts to water quality during construction activities would cease upon completion of the project.

6.3.4 Soil Resources

Soils would be temporarily disturbed at the location associated with the proposed construction activities. However, erosion and sedimentation control measures such as silt fences, straw bales, sediment traps, and application of water sprays to freshly disturbed soil would be implemented to minimize impacts to soils and decrease the potential for erosion and sedimentation of nearby water bodies. In addition, stockpiling topsoil for re-use would be implemented to preserve soil quality and sustain re-established vegetation. Potential compaction of soil from construction activities would be minimized by employing BMPs for heavy equipment use, such as utilizing designated access routes and limiting operations in wet conditions.

6.3.5 Hazardous Materials and Waste

The FTU facility construction of the Proposed Action would likely disturb soils in the APE. Any excavated soil suspected of containing contaminants and that is not suitable for use on the site would be stockpiled on site and tested to determine proper disposal requirements. The sample results would be submitted to 436 CES/CEAN for interpretation. The 436 CES/CEAN would use the hazardous waste limitations in 40 CFR, AFI 32-7086 and the Dover AFB Action Management Plan when evaluating the Toxicity Characteristic Leaching Procedure (TCLP) results to determine if the soil must be disposed of as hazardous waste. The other remaining parameters are required for disposal at a Delaware Solid Waste Authority (DSWA) facility and have associated DSWA limitations. Those limitations would be compared to the results to determine if the soil can be disposed of within the State of Delaware if the soil is not deemed a hazardous waste. If soil is hazardous waste, it would be disposed of accordingly at a disposal facility permitted to accept hazardous waste. If the soil is non-hazardous waste but does not meet the limitations of the DSWA, the soil would be disposed of at a disposal facility permitted to accept such waste.

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7.0 LIST OF PREPARERS

Name	Company	Years Experience	Contribution
Will Dean, Vice President, AFCEE Services	Geo-Marine, Inc.	32	Senior Program Manager AFCEE Programs
Tony Cecchi, Vice President, Planning and Analysis	Geo-Marine, Inc.	20	Quality Assurance
Kurt Hellauer, Department Manager	Geo-Marine, Inc.	19	Quality Assurance / Airspace / AICUZ / Noise
Susan Miller, Senior NEPA Project Manager	Geo-Marine, Inc.	22	Project Manager / Chapters 1 and 2 / Air Quality / Executive Summary / Cumulative / Mitigation
Phyllis Fletcher, Document Production Manager	Geo-Marine, Inc.	17	Document Production / Editing
Brian Bishop, NEPA Analyst	Geo-Marine, Inc.	4	Socioeconomics / Environmental Justice / Ground Safety / Soil Resources / References
Matt Wyrk, GIS Lead	Geo-Marine, Inc.	4	Mapping / Figure Production
Darrell Pennington, Airspace Analyst	Geo-Marine, Inc.	21	Airspace / AICUZ / Noise / Flight Safety
Ryan Seltzer, Environmental Scientist	Geo-Marine, Inc.	4	Water Resources / Hazardous Materials / Acronyms and Abbreviations

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8.0 PERSONS AND AGENCIES CONTACTED

8.1 Distribution of the Draft Environmental Assessment

A number of U.S. Air Force technical experts provided data and were consulted in preparation of this EA and are presented below. As part of CEQ regulations (40 CFR §1503.1), public comments on the Draft EA were invited. This process helps decision makers and the public to understand and have input on the environmental effects of Federal actions. A public notice was published in the Delaware State News on February 20 and 23, 2010. This EA was available to individuals for public review and comment for 30 days from February 19, 2011 through March 21, 2011. It was available for review in person at 436 CES/CEAN.. No public comments were received.

Proponent	
Name/Position	**Office**
Daniel Cevallos Jr., DAF Contracting Officer	AFCEE/ACV
Mark Stough, DAF Project Manager, Environmental Programs Execution Eastern	AFCEE/EXEE
Steven Seip, P.E., Chief Environmental Quality	Dover AFB 436 CES/CEAN
Bill Bushman, Program Manager Golf Course Environmental Management & Environmental Impact Analysis	AFCEE/TDB
Paul E. Takács Environmental Engineer	HQ AMC/A7PI
Burton R. (Bob) Lester, Jr. AICUZ Program Manager	AFCEE/TDBS
Nancy Mabie, DAF Mathematician / Noise Analyst Planning & Design Standards Section	AFCEE/TDBS
Castaneda, Francisco III, CIV	AFCEE/TDNQ
Jari Ulmer Physical Scientist	SCEP, AFCEE/TDNQ
Todd W. Wilson, Maj, USAF	Dover AFB 436 OG/C-5M Program Office
Tricia Faust Community Planner	Dover AFB 436 CES/CEAO
Jason Halpin CES/Programming	Dover AFB 436 CES/Programming

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APPENDIX A
DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL COORDINATION LETTER

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STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENTAL CONTROL
DIVISION OF FISH & WILDLIFE
NATURAL HERITAGE & ENDANGERED SPECIES
4876 HAY POINT LANDING ROAD
SMYRNA, DELAWARE 19977
TELEPHONE: (302) 653-2
FAX: (302) 653-3

July 25, 2005

Rayanne Benner
436 CES/CEV
600 Chevron Ave, Dover AFB DE 19902

RE: Federally listed species at the Dover Air Force Base

Dear Ms. Benner:

Thank you for contacting the Natural Heritage and Endangered Species program about information pertaining to the potential for federally listed rare, threatened and endangered species to occur at the Dover Air Force Base.

Plants:

Below is a list of plant species found in Delaware that are either listed as endangered, threatened, or a candidate by the U.S. Fish and Wildlife Service. These species are very habitat specific and require specialized and unique environmental conditions. Based on past surveys, these conditions have never been found to exist within the boundaries of the Dover Air Force Base, and are likely never too be found. Therefore, new surveys for these species at the Dover Air Force Base are not necessary. Full descriptions of the habitat needs for these species are available upon request. If you have any questions regarding rare plants, please contact our program botanist Bill McAvoy at (302) 653-2880.

Federally Listed and Candidate Plant Species Occurring in the State of Delaware

Scientific Name	Common Name	State Rank	State Status	Global Rank	Federal Status
Oxypolis canbyi	Canby's dropwort	SH		G2	LE
Schwalbea Americana	American chaffseed	SX		G2	LE
Aeschynomene virginica	sensitive jointvetch	SX		G2	LT
Amaranthus pumilis	seabeach amaranth	S1		G2	LT
Helonias bullata	swamp pink	S2		G3	LT
Isotria medeoloides	small whorled pogonia	S1		G2G3	LT

Delaware's Good Nature Depends on You!

Rhynchospora knieskernii	Knieskern's beakrush	SX		G1	LT
Narthecium americanum	bog asphodel	SX		G2	Candidate
Dichanthelium hirstii	Hirst's panic grass	S1		G1	Candidate

State Rank: S1 - extremely rare within the state (typically 5 or fewer occurrences); S2- very rare within the state (6 to 20 occurrences); B - Breeding; N - Nonbreeding; SX-Extirpated or presumed extirpated from the state. All historical locations and/or potential habitat have been surveyed; SH- Historically known, but not verified for an extended period (usually 15+ years); there are expectations that the species may be rediscovered; SE-Non-native in the state (introduced through human influence); not a part of the native flora or fauna.
State Status: E – endangered, i.e. designated by the Delaware Division of Fish and Wildlife as seriously threatened with extinction in the state;
Global Rank: G1 - imperiled globally because of extreme rarity (5 or fewer occurrences worldwide); G2 - imperiled globally because of great rarity (6 to 20 occurrences); G3 - either very rare and local throughout its range (21 to 100 occurrences) or found only locally in a restricted range; G4 - apparently secure globally but uncommon in parts of its range; G5 - secure on a global basis but may be uncommon locally; T_ - variety or subspecies rank; Q – questionable taxonomy;
Federal Status: LE – endangered, i.e. designated by the U.S. Fish and Wildlife Service as being in danger of extinction throughout its range; LT – threatened, i.e. designated by USFWS as being likely to become endangered in the foreseeable future throughout all or a significant portion of its range; Candidate – Taxa for which the U.S. Fish and Wildlife Service has on file enough substantial information on biological vulnerability and threat(s) to support proposals to list them as endangered or threatened species.

Bald Eagle (*Haliaeetus leucocephalus*)
Federal Status-PS:LT, State status-E, State Rank-S2B/S3N, Global Rank-G4, :

Aerial surveys for Bald Eagle are conducted annually and there are currently no nests located on Dover Air Force Base property. The closest nest is located adjacent to the St. Jones River across Rt. 1. The trees on the extreme west side of the base bordering the east bank of the St. Jones River may be utilized for foraging or roosting.

Piping Plover (*Charadrius melodus*)
Federal Status-LE, State Status-E, State Rank-S1B, Global Rank-G3

This rare bird species typically use open, sandy, ocean beaches to nest and forage. No such habitat is present at Dover Air force Base.

Delmarva Fox Squirrel (*Sciurus niger cinerus*)
Federal Status-LE, State Status-E, State Rank-S1, Global Rank-G5T3

Delmarva fox squirrels are tree squirrels that thrive in mature hardwood, pine and mixed forests with closed canopies and open understories. They were once thought to be extirpated from Delaware and are only currently documented in three Delaware locations; Prime Hook National Wildlife Refuge (reintroduced population), Nanticoke Wildlife Area (likely natural expansion of Maryland population) and Assawoman Wildlife Area (reintroduced population). Due to the location of the Dover Air Force Base and lack of habitat on site, Delmarva fox squirrels are not likely to occur at the base.

Bog Turtle (*Glyptemys muhlenbergii*)
Federal Status-LT, State Status-E, State Rank-S1, Global Rank-G3

Bog turtles generally inhabit freshwater wetlands with open canopies, shallow running water, and pockets of deeper water and dry areas. Favorable habitats are usually small and bordered by vegetated or wooded areas. Most occupied bog turtle habitats include soft-bottomed substrate with muck a least a couple inches deep. Pedestal vegetation such

as tussock sedges (*Carex stricta*) are usually present and provide cover and oviposition sites. Dover Air force Base is approximately 15 miles south of the southernmost bog turtle record in Delaware. Therefore, the likelihood of bog turtles occupying wetlands on the base is minimal.

Dwarf Wedgemussel (*Alasmidonta heterodon*)
Federal Status-LE, State Status-E, State Rank-SH, Global Rank-G1G2

This rare freshwater mussel typically inhabits flowing freshwater streams and this type of aquatic habitat is not present at the Dover Air Force Base.

Federally Listed Fish, Marine Mammals and Sea Turtles:

None of these species occur at the Dover AFB as there is no suitable marine or estuarine aquatic habitat.

If you have any questions, please contact me at (302) 653-2883 ext. 126.

Sincerely,
Edna J. Stetzar
Edna J. Stetzar
Biologist/Environmental Review Coordinator

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APPENDIX B
AIRSPACE CLASSIFICATION

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Appendix B – Airspace Classification and Air Traffic Control Service

The Federal Aviation Administration (FAA) is both the regulator of aeronautical activities in the United States and operator of the air traffic control (ATC) system. The agency licenses airmen and aircraft, regulating the standards to which pilots are trained and the standards to which equipment is manufactured prior to licensing either. In addition, the FAA constructs and operates a system of navigational facilities that facilitate aircraft operations that can occur without a pilot's having visual reference to the ground. These facilities define air routes along which aircraft may operate, providing an all-weather capability and outlining a predictable flight track.

The FAA also operates the ATC system. The primary purpose of ATC service is to prevent collisions of participating aircraft operating within airspace within which ATC jurisdiction is exercised, commonly known as *controlled* airspace, by separating their operations. To facilitate provision of ATC service, therefore, the FAA categorizes airspace and establishes rules governing operations therein. Airspace is categorized first according to whether any level of separation is provided; that is, whether any type of clearance authorizing an operation is required. This first level of division of airspace is *controlled or uncontrolled.* The FAA does not require or provide ATC clearances in uncontrolled airspace because ATC cannot assume responsibility for separation without having the ability to control operations.

By definition, once an aircraft commences operation for the purpose of taking flight it is operating within the National Airspace System (NAS) and is always located within one or the other major types of airspace, controlled or uncontrolled. Controlled airspace is subdivided into classes that correlate to the types of ATC separation that is provided within them. The divisions correlate to the degree of participation required and levels of service provided. Which particular classification of controlled airspace is chosen depends upon the nature of the services to be provided. Airspace classes are mutually exclusive; however, they frequently overlie one another. Separation of aircraft operating on ATC clearances is accomplished through a variety of measures; the system employs equipment, procedures and personnel to achieve separation. Examples of equipment used in ATC are airborne and ground based such as radio, radar and transponders. The FAA develops and enforces procedures to standardize operations within the NAS; and, it employs personnel to actively control the traffic flow as it occurs by conveying instructions that pilots then execute.

Prior to the development of an ATC system, separation was simply a matter of pilots visually identifying other aircraft and avoiding them by changing course. This method, *"see and avoid,"* remains the cornerstone of separation technique when operating in weather conditions that allow for it. Operations conducted under Visual Flight Rules (VFR) primarily rely upon "see and avoid" for separation. However, operations in clouds or during periods of limited visibility required the development of different separation techniques since pilots could not see each other in order to avoid each other. Instrument Flight Rules (IFR) and ATC were developed to address the challenge of separating air traffic in Instrument Meteorological Conditions (IMC).

Over time, the "see and avoid" method was also found to be deficient as a separation technique in areas with a high density of operations even when IMC was not present. In response, ATC service evolved over time in order to overcome those deficiencies by developing procedures and enforcing their use in the control of air traffic in areas with a high density of operations.

A *clearance* is defined as an authorization and a set of instructions to a particular aircraft to proceed under specified traffic conditions within controlled airspace, given by ATC for the purpose of preventing collision between known aircraft. By having aircraft fly along a pre-defined route and having its crew report its position along the route periodically, separation is achieved by having all other aircraft that are operating on an ATC clearance fly at a different altitude, or at a different position along the same route at the same altitude. Prior to the advent of radar, controllers would rely upon position reports from aircrews to determine routings available for other aircraft. With radar and on-board transponders that identify unique aircraft, ATC is able to determine the bearing and distance of an aircraft from a known point as well as its altitude and groundspeed, making it possible to dispense with position reporting in a radar environment.

The FAA defines minimum separation standards applied in the control of air traffic. An example of a separation standard is, in a non-radar environment, do not issue a clearance to an aircraft operating under IFR such that it would operate closer than 5 miles horizontally to another aircraft on an IFR clearance, unless separated by at least 1000 feet vertically. An alternative standard could be to provide 20 minutes of in-trail separation for aircraft operating on the same published route. Widespread use of radar allowed for reduced separation distances and thereby the accommodation of greater numbers of aircraft in the same geographic area. The separation standards applicable in a given situation depend upon whether the ATC is being exercised with

benefit of radar or not. In a radar environment, the standards also reflect the varied capabilities of the equipment in use and the distance of aircraft from the ground station.

In addition to separation of air traffic in flight, separation of aircraft on the runway is provided. This occurs by clearing only one aircraft onto a runway from a taxiway at a time and by clearing only one aircraft in flight to land on a runway at a time. These activities are called movement area (runway environment) separation and sequencing for landing, respectively. Sequencing is not the same as in-flight separation; ATC makes no assurance of collision avoidance for VFR traffic approaching for landing, and there is no defined distance or time standards applied to sequencing. Instead, "see and avoid" is applied by the pilots of aircraft operating under VFR in the airport environment. Because no separation service is provided, it is not considered a clearance, meaning a pre-defined route and authorization. Despite the fact that it is not a clearance, there is a requirement to maintain communications with ATC for sequencing and movement area control.

Regardless of what standard is applied or the environment (radar or non-radar) under which control is exercised, ATC is only able to assure separation if those aircraft being separated are required to participate in the system, and pilots are trained in how to do so. So for example, the Federal Aviation Regulations (FAR) prohibit operations in controlled airspace during IMC unless they are conducted under IFR, and are conducted by pilots and aircraft rated for such operations. The FARs also require the receipt of a specific clearance be prior to beginning the operation, and adherence to the terms of that clearance during the operation. Also, to put all users on notice of when IFR operations are required in controlled airspace, the regulations define what weather conditions (cloud clearance distance and forward visibility) would constitute IMC. This definition varies depending upon the airspace classification. For example, when operating in uncontrolled airspace near the surface of the earth, aircraft must remain clear of clouds and forward visibility must be at least one mile during daylight hours.

If it is desired to provide separation of IFR traffic in all phases of a flight from takeoff to landing, it is necessary to have controlled airspace exist from an airport surface to the pre-defined air navigation route, along the route itself, and down to the surface of the airport of intended landing. It also is necessary to have a method of determining whether Instrument Meteorological conditions are present; unlike uncontrolled airspace, a specific dimension distance requirement from clouds exists for VFR flight. For example, VFR operations in one class of controlled

airspace (Class C) require a minimum ceiling (the distance from the surface to the base of a cloud deck) of no less than 1,000 feet and ground visibility of 3 miles. Designating controlled airspace at the surface requires either a trained weather observer on duty using specialized equipment, or automated weather observing equipment continuously reporting the conditions. In less populated areas and at less congested airports, controlled airspace will begin at a point in space of a fixed dimension above ground level (AGL) or at a specific altitude above mean sea level (MSL).

Air Traffic Control Airspace Classes

Class A airspace exists from 18,000 feet MSL to 60,000 feet MSL generally above the territorial limits of the United States. Within these altitude strata, all aircraft must operate under IFR and on an ATC clearance. Positive control of all aircraft movement is therefore exercised by ATC and all aircraft are separated from each other. This airspace generally embraces the high-altitude en route structure used by commercial air traffic, high performance general aviation, and the military.

In areas with an extremely high density of aircraft operation and having high volumes of scheduled airline service, the FAA designates *Class B* airspace. Functionally, it is similar to Class A airspace; it is a positive control environment in that a specific clearance is required prior to entry , and ATC separation of all aircraft from each other is provided. However, unlike Class A airspace, aircraft operating under VFR are authorized if certain equipment and pilot experience requirements are met. Class B airspace has a typical design shape; it generally is cylindrical centered upon the high density airport and goes outward in tiers, generally to a ring about 25 miles from the primary airport. It usually is described as looking like an upside down wedding cake because close in at the airport, the floor of the airspace is at the surface, and as one moves outward, the floor steps up to varying altitudes. The ceiling of the airspace rings is invariably uniform, normally up to 10,000 feet AGL. Because VFR traffic are not operating under IFR, separation is dependent upon radar; in the event of an outage, no separation of VFR traffic is provided.

Class C airspace is established around medium sized hub airports that have significant numbers of operations, but are not as busy as major metropolitan area airports. While participation is mandatory, separation is only provided if one of the aircraft is operating under IFR. No clearance is required for VFR operations within Class C airspace, but sequencing services and

separation in the runway environment are provided. Therefore, a communications requirement exists. Less stringent equipment and pilot experience levels are required than for operations within either Class A or Class B airspace. The airspace is similar in design to Class B, but smaller and simpler. Two concentric cylinders 10 nautical miles in radius centered on the primary airport, and extending from the surface to a uniform ceiling generally 4000 feet AGL is the standard design. Like Class B above, the separation provided to VFR aircraft requires operational radar service; however, in the event of an outage, the services provided revert to Class D airspace and service.

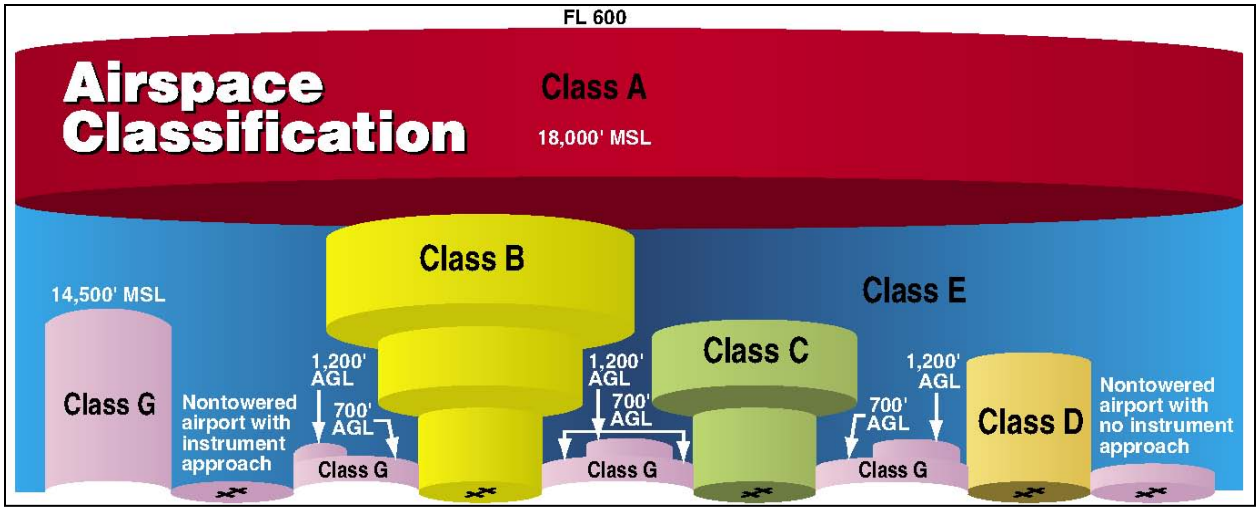
Class D airspace is established around smaller airports having sufficient operations to warrant an air traffic control tower. Participation is mandatory in that communications are required; however, only IFR aircraft are separated from each other. No in-flight separation of aircraft operating under VFR is provided by ATC. Sequencing and separation of aircraft in the runway environment are provided. The airspace normally is a circle having a 5 statue mile radius, extending from the surface to 2,500 feet AGL.

Class E airspace represents the least restricted end of the controlled airspace continuum; only aircraft operating under IFR must obtain an air traffic control clearance, and the separation provided is only from other IFR traffic. For VFR traffic, no communications requirement exists and no separation of air traffic is provided. Class E airspace can be established from the surface upward at an airport, provided a weather observing capability exists. Otherwise, it generally begins either 700 feet or 1200 feet above the surface.

The designations of airspace conform to conventions adopted by the International Civil Aviation Organization (ICAO). In the United States, there is no airspace equivalent to Class F airspace; therefore none is designated.

Class G airspace is the only category of uncontrolled airspace. No ATC separation is provided within Class G airspace and no clearance is required for IFR flight. General aviation airports without published instrument approach procedures and weather observation capability would lie within Class G airspace. Figure B-1 visually depicts airspace classifications in summary form.

Rulemaking and public notice are required to establish or change the boundaries of types of controlled airspace such as Class A through Class E airspace. Class G airspace is uncontrolled airspace; it is defined as any airspace not designated in any of the foregoing controlled airspace categories. See Tables B-1 and B-2 for airspace classifications.



Source: FAA 2008

Figure B-1 Air Traffic Control Airspace Classifications (Profile View)

Special Use Airspace Types

In addition to the classifications above, airspace may also lie within *Special Use Airspace (SUA).* This term refers to airspace defined for a particular purpose and for the benefit of a particular user, usually the military. *Prohibited Areas, Restricted Areas, Warning Areas, Military Operations Areas (MOA), Military Training Routes (MTR)* and *Air Traffic Control Assigned Airspace* are examples of special use airspace. *Prohibited Areas* and *Restricted Areas* are established by a public rulemaking process; they exist to exclude non-participating and incompatible aircraft; their presence is depicted on aviation charts, and operating regulations forbid entry to non-participating aircraft without the permission of the controlling agency. Operations within Restricted Areas would normally include artillery firing, aerial gunnery and bombardment, and high speed and density aerial operations. A Warning Area performs a similar function for the military services; however, it is defined and depicted in those areas outside the territorial jurisdiction of the United States and therefore does not prohibit or restrict aircraft operations.

As part of the provision of ATC service, a speed limit for aircraft operating in certain airspace classes and in certain altitude strata was *established*. Below 10,000 feet MSL, no aircraft may exceed 250 nautical miles per hour (knots) unless it cannot safely be flown that slowly. In Class B, Class C and Class D airspace, the speed limit is 200 knots. The purpose of MOAs and MTRs

Table B-1 Controlled Airspace Classifications

Designation[1]	Types of Operations Permitted	Participation Required / Clearance Required / Communication Required	ATC Services Provided	Altitudes	Lateral Sizes
Class A	IFR Only	Yes / Yes / Yes	IFR – Separation from other IFR traffic	18,000 ft MSL (referred to as FL 180) to 60,000 ft MSL (FL 600)	Overlies continental United States & territorial waters
Class B	IFR/VFR	Yes / Yes / Yes	IFR – Separation from other IFR traffic	Surface to 10,000 ft AGL (typical); tiered rings	25 nautical miles from primary airport
Class C	IFR/VFR/ SVFR	IFR – Yes / Yes / Yes VFR – Yes / No / Yes	Separation of IFR traffic, sequencing ; separation of surface operations	Surface to 4,000 ft AGL (typical); tiered rings	10 nautical miles from primary airport
Class D	IFR/VFR/ SVFR	IFR – Yes / Yes / Yes VFR – Yes /No/ Yes	Separation of IFR traffic, sequencing ; separation of surface operations	Surface to 2,500 ft AGL (typical); single ring	5 statute miles from primary airport
Class E	IFR/VFR/ SVFR	IFR – Yes / Yes / Yes VFR – No / No / No	Separation of IFR traffic	700/1200 ft AGL to 17,999 ft MSL (typical), may extend to surface	Varies
Class G	IFR/VFR	NA	No Air Traffic services provided	Surface to 700/1200 ft AGL (typical)	Varies

Notes: ATC = Air Traffic Control; AGL = above ground level; MSL = above mean sea level; ft = feet; VFR = Visual Flight Rules; IFR = Instrument Flight Rules; SVFR =Special Visual Flight Rules; DoD = Department of Defense ; NA = not applicable

1. These classifications correspond to categories promulgated by the International Civil Aviation Organization (ICAO). There is no Class F airspace equivalent in the United States

is to authorize and disclose military operations that exceed the speed limit of 250 knots that would ordinarily exist below 10,000 feet MSL. Civilian aircraft operating under VFR may operate within MOAs and along MTRs without a clearance or communication requirement; in practice, these areas are often avoided by civilian traffic. However, ATC will not issue a clearance to IFR traffic that crosses an active MOA or MTR because it cannot provide separation. Instead, the civilian IFR traffic would be routed around the MOA or MTR. Special use airspace classifications are not mutually exclusive; an MTR can traverse a MOA that can underlie a restricted area.

A rulemaking is required to establish any airspace that excludes civil aircraft operations; that is, defining an airspace unit that would no longer exist for the benefit of all users. The two types of airspace that exclude civil aircraft operations are Restricted Areas and Prohibited Areas. Designation of a military training route (MTR), a military operations area (MOA), an alert area or a warning area does not require a rulemaking action because the airspace the remains in the public domain and no regulatory restriction prevents its use by all users. See Table B –3 for special use airspace classifications.

Table B-3 Special Use Airspace Classifications

Designation[1]	Purpose	Regulatory Airspace?	Available to Civilian /Non-Participating Users?	ATC IFR Separation Services Provided	VFR Permitted	Typical Dimensions
Prohibited Areas	To protect the President or other High Value National Assets	Yes	Only with permission of using agency (usually US Secret Service)	No	No	Varies in lateral shape and vertical dimensions. Example: P-40 (Camp David) is 5 miles in diameter up to 5,000 ft AGL.
Restricted Area	To prevent harm to non-participating aircraft by excluding their entry; to authorize use of munitions; to authorize operations above 250 knots below 10,000 ft MSL	Yes	Joint Use –With permission of Controlling Agency (ATC) when released by using agency (usually DoD). Non Joint Use – Only with permission of using agency	Joint Use – Only when released by using agency. Non-Joint Use – No	Joint Use – Only when released by using agency. Non Joint Use – No.	Varies in lateral shapes and vertical dimensions as needed to contain activities hazardous to non-participating aircraft

Note: ATC = Air Traffic Control; MOA = Military Operations Area; ATCAA = Air Traffic Control Assigned Airspace; AGL = above ground level; MSL = above mean sea level; ft = feet; VFR = Visual Flight Rules; IFR = Instrument Flight Rules; DoD = Department of Defense ; NA = not applicable

1. Except for ATCAAs, all other SUA is not designated above 17,999 ft MSL as it is unnecessary to preclude VFR operations above that altitude, and ATC can reroute any conflicting IFR operations occurring within controlled airspace.

Table B-3. Special Use Airspace Classifications (cont'd)

Designation[1]	Purpose	Regulatory Airspace?	Available to Civilian /Non-Participating Users?	ATC IFR Separation Services Provided	VFR Permitted	Typical Dimensions
Warning Area	To prevent harm to non-participating aircraft by disclosing potentially hazardous activities; to authorize use of munitions and operations above 250 knots below 10,000 ft MSL	No	Yes / Yes (Warning Area airspace lies outside of territorial limits of United States and is not subject to FAA regulation)	Joint Use – Only when released by using agency Non-Joint Use – No	Yes, at own risk.	Varies in lateral shapes and vertical dimensions as needed to contain activities hazardous to non-participating aircraft
Military Training Route	To authorize operations in excess of 250 knots below 10,000 ft MSL; to disclose low altitude navigation and training corridors	No	VFR – Yes / Yes IFR – Only when released by using agency (DoD)	Only when released by using agency	Yes, at own risk.	Linear route corridors, typically 5-10 miles wide; route length can be hundreds of miles and altitudes vary from the surface to 3000 ft AGL (typical).

Notes: ATC = Air Traffic Control; ATCAA = Air Traffic Control Assigned Airspace; FAA = Federal Aviation Administration; AGL = above ground level; MSL = above mean sea level; ft = feet; VFR = Visual Flight Rules; IFR = Instrument Flight Rules; DoD = Department of Defense ; NA = not applicable

1. Except for ATCAAs, all other SUA is not designated above 17,999 ft above MSL as it is unnecessary to preclude VFR operations above that altitude, and ATC can reroute any conflicting IFR operations occurring within controlled airspace.

Table B-3. Special Use Airspace Classifications (cont'd)

Designation[1]	Purpose	Regulatory Airspace?	Available to Civilian /Non-Participating Users?	ATC IFR Separation Services Provided	VFR Permitted	Typical Dimensions
Military Operations Area	To authorize operations in excess of 250 knots below 10,000 ft MSL; to disclose areas with high density military operations and military acrobatic activity	No	VFR – Yes / Yes IFR – Only when released by using agency (DoD)	Only when released by using agency	Yes, at own risk.	Varies in lateral shapes and vertical dimensions as needed to contain activities hazardous to non-participating aircraft
Air Traffic Control Assigned Airspace (ATCAA)	To contain military operations within a defined area, often overlying a Restricted Area or MOA	No	VFR – Not Applicable (Airspace only exists above 18,000 ft MSL in Class A airspace) IFR – Only when released by using agency (DoD)	Only when released by using agency	NA	Varies in lateral shapes and vertical dimensions as needed to contain activities hazardous to non-participating aircraft

Note: ATC = Air Traffic Control; MOA = Military Operations Area; ATCAA = Air Traffic Control Assigned Airspace; MSL = above mean sea level; ft = feet; VFR = Visual Flight Rules; IFR = Instrument Flight Rules; DoD = Department of Defense ; NA = not applicable

1. Except for ATCAAs, all other SUA is not designated above 17,999 ft above MSL as it is unnecessary to preclude VFR operations above that altitude, and ATC can reroute any conflicting IFR operations occurring within controlled airspace.

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APPENDIX C
RACE, EMPLOYMENT, AND POVERTY CHARACTERISTICS

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Census 2000 Race Characteristics

	Delaware		Kent County		City of Dover		ROI	
Subject	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Total population (all races)	783,600	100.0	126,697	100.0	32,135	100.0	79,461	100.0
WHITE								
White alone or in combination[1]	594,425	75.9	95,159	75.1	18,214	56.7	53,289	67.1
White alone	584,773	74.6	93,106	73.5	17,655	54.9	51,876	65.3
White in combination[1]	9,652	1.2	2,053	1.6	559	1.7	1,413	1.8
Not White alone or in combination[1]	189,175	24.1	31,538	24.9	13,921	43.3	26,172	32.9
BLACK OR AFRICAN AMERICAN								
Black or African American alone or in combination[1]	157,152	20.1	27,678	21.8	12,467	38.8	20,374	25.6
Black or African American alone	150,666	19.2	26,180	20.7	11,961	37.2	19,287	24.3
Black or African American in combination[1]	6,486	0.8	1,498	1.2	506	1.6	1,087	1.4
Not Black or African American alone or in combination[1]	626,448	79.9	99,019	78.2	19,668	61.2	59,087	74.4
AMERCIAN INDIAN AND ALASKA NATIVE								
American Indian and Alaska Native alone or in combination[1]	6,069	0.8	1,637	1.3	379	1.2	373	0.5
American Indian and Alaska Native alone	2,731	0.3	806	0.6	146	0.5	184	0.2
American Indian and Alaska Native in combination[1]	3,338	0.4	831	0.7	233	0.7	189	0.2
Not American Indian and Alaska Native alone or in combination[1]	777,531	99.2	125,060	98.7	31,756	98.8	79,088	99.5
ASIAN								
Asian alone or in combination[1]	18,944	2.4	2,783	2.2	1,211	3.8	1,823	2.3
Asian alone	16,259	2.1	2,137	1.7	1,016	3.2	1,154	1.5
Asian in combination[1]	2,685	0.3	646	0.5	195	0.6	669	0.8
Not Asian alone or in combination[1]	764,656	97.6	123,914	97.8	30,924	96.2	77,638	97.7

Census 2000 Race Characteristics (cont'd)

	Delaware		Kent County		City of Dover		ROI	
Subject	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
NATIVE HAWAIIAN AND OTHER PACIFIC ISLANDER								
Native Hawaiian and Other Pacific Islander alone or in combination[1]	671	0.1	177	0.1	62	0.2	0	0.0
Native Hawaiian and Other Pacific Islander alone	283	0.0	50	0.0	12	0.0	0	0.0
Native Hawaiian and Other Pacific Islander in combination[1]	388	0.0	127	0.1	50	0.2	0	0.0
Not Native Hawaiian and Other Pacific Islander alone or in combination[1]	782,929	99.9	126,520	99.9	32,073	99.8	79,461	100.0
SOME OTHER RACE								
Some other race alone or in combination[1]	20,391	2.6	2,346	1.9	767	2.4	832	1.0
Some other race alone	15,855	2.0	1,611	1.3	503	1.6	446	0.6
Some other race in combination[1]	4,536	0.6	735	0.6	264	0.8	386	0.5
Not Some other race alone or in combination[1]	763,209	97.4	124,351	98.1	31,368	97.6	78,629	99.0

Source: USCB 2000b

Notes: ROI = region of influence

1. In combination with one or more of the other races listed. The six numbers for race "alone or in combination" may add to more than the total population and the six percentages for race "alone or in combination" may add to more than 100 percent because individuals may report more than one race.

Census 2000 Employment Characteristics

Employment Status	Delaware		Kent County		City of Dover		ROI	
	Population	**%**	**Population**	**%**	**Population**	**%**	**Population**	**%**
Population 16 years and over	**610,289**	**100**	**95,895**	**100**	**25,596**	**100**	**60,599**	**100.0**
In labor force	401,152	65.7	64,387	67.1	16,320	63.8	40,831	67.4
Armed forces	3,792	0.6	3,079	3.2	1,002	3.9	2,813	4.6
Civilian labor force	397,360	65.1	61,308	63.9	15,318	59.8	38,018	62.7
Employed	376,811	61.7	57,895	60.4	14,174	55.4	35,609	58.8
Unemployed	20,549	3.4	3,413	3.6	1,144	4.5	2,409	4.0
Percent of civilian labor force	5.2	NA	5.6	NA	7.5	NA	6	NA
Not in labor force	209,137	34.3	31,508	32.9	9,276	36.2	19,768	32.6

Source: USCB 2000b

Notes: ROI = Region of Influence; % = percent; NA = not applicable.

Census 2000 Poverty Thresholds by Size of Family and Number of Related Children Under 18 Years (Dollars)

Size of family unit	Related children under 18 years								
	None	One	Two	Three	Four	Five	Six	Seven	Eight or more
One person (unrelated individual):									
Under 65 years.....	8,959								
65 years and over	8,259								
Two people:									
Householder under 65 years	11,531	11,869							
Householder 65 years and over .	10,409	11,824							
Three people.	13,470	13,861	13,874						
Four people.	17,761	18,052	17,463	17,524					
Five people	21,419	21,731	21,065	20,550	20,236				
Six people	24,636	24,734	24,224	23,736	23,009	22,579			
Seven people	28,347	28,524	27,914	27,489	26,696	25,772	24,758		
Eight people	31,704	31,984	31,408	30,904	30,188	29,279	28,334	28,093	
Nine people or more	38,138	38,322	37,813	37,385	36,682	35,716	34,841	34,625	33,291

Source: USCB 2001c

APPENDIX D
AIR QUALITY DATA

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Proposed Action C-5 Aircraft Emissions

C-5A/B Engine ID	Power Setting	Mode	Fuel Consumption (lb/hr)	Emission Rates, lb/1000 lb Fuel Burned				Number of Sorties/year[1]	Time in Mode (min)	Time in Mode (hr)	Total Emissions (tons/year)			
				NOx	CO	VOC	Total PM				NOx	CO	VOC	Total PM[2]
TF39-GE-1C	Idle/Taxi Out	Idle	1448	3.36	58.21	16.43	2.75	336	32.5	0.54	1.77	30.68	8.66	1.45
Input	Take off	Intermediate	10477	28.16	1.63	0.00	0.89	672	0.7	0.01	4.63	0.27	0.00	0.15
# Engines	Climbout	Military	12541	32.66	1.28	0.00	1.18	672	2.5	0.04	22.94	0.90	0.00	0.83
4	Approach	Approach	13861	24.72	0.77	0.67	1.19	672	5.2	0.09	39.91	1.24	1.08	1.92
	Taxi In/Idle	Idle	1448	3.36	58.21	16.43	2.75	336	14.9	0.25	0.81	14.07	3.97	0.66
Total Emissions											**70.06**	**47.16**	**13.71**	**5.01**
C-5M	**Power Setting**	**Mode**	**Fuel Consumption (lb/hr)**	**Emission Rates, lb/1000 lb Fuel Burned**				**Total Emissions (tons/year)**			**Total Emissions (tons/year)**			
Engine ID				**NOx**	**CO**	**VOC**	**Total PM**	**Number of Sorties/year**	**Time in Mode (min)**	**Time in Mode (hr)**	**NOx**	**CO**	**VOC**	**Total PM**
CF6-80C2B1	Idle/Taxi Out	Idle	1710.59	3.72	43.13	8.94	0.38	336	32.5	0.54	2.32	26.86	5.57	0.24
Input	Take off	Intermediate	15053.69	21.21	0.56	0.08	0.31	672	0.7	0.01	5.01	0.13	0.02	0.07
# Engines	Climbout	Military	18310.64	28.05	0.56	0.08	0.32	672	2.5	0.04	28.76	0.57	0.08	0.33
4	Approach	Approach	4985.14	8.81	2.37	0.20	0.21	672	5.2	0.09	5.12	1.38	0.12	0.12
	Taxi In/Idle	Idle	1710.59	3.72	43.13	8.94	0.38	336	14.9	0.25	1.06	12.31	2.55	0.11
Total Emissions											**42.26**	**41.25**	**8.34**	**0.87**

Source: AFCEE based on C-5A/B Emissions - Table 3-3, Air Emission Inventory Guidance Document for Mobile Sources at Air Force Installations, 2001; C-5M Emissions - Table 39-6, Air Emission Inventory Guidance Document for Mobile Sources at Air Force Installations, 2010

Notes: 1b = pound; hr = hour; min= minute; yr = year; NOx = nitrous oxide; CO = carbon monoxide; VOC = volatile organic compounds; PM = particulate matter
1. Assumptions: Proposed Action will add 336 flights to Dover mission: 1 flight = 1 Landing and Take Off (LTO) cycle + 1 Touch and Go (TGO) cycle. LTO cycle = Idle-Intermediate-Military-Approach-Idle; TGO cycle = Approach-Intermediate-Military
2. Sample Calculation: Fuel Consumption (lb/hr) x Emission Rate (lb of Pollutant/1000lb) x Sorties/year x # Engines x Time (hr) x (tons/2000 lbs) = Total Emission (tons per year)

Proposed Action Aircraft Ground Support Equipment Estimated Emissions

ASSOCIATED GROUND EQUIPMENT	Fuel	Input LTO[1]	Operating Time Hours Operated/LTO	Average Operating Load	NOx (lb/hr)	NOx (lbs/yr)	NOx (tons/yr)	CO (lb/hr)	CO (lbs/yr)	CO (tons/yr)	VOC (lb/hr)	VOC (lbs/yr)	VOC (tons/yr)	PM (lb/hr)	PM (lbs/yr)	PM (tons/yr)
A/M32A-86D Gen	Diesel	336	13	25%	7.97	8703.24	4.35	1.52	6639.36	3.31968	0.2	873.6	0.4368	0.091	397.488	0.198744
A/M32A-95	Diesel	336	2		1.47	987.84	0.49	5.86	3937.92	1.96896	0.07	47.04	0.02352	0.11	73.92	0.03696
MA-3D	Diesel	336	7.5		0.5	1260.00	0.63	0.13	327.6	0.1638	0.01	25.2	0.0126	0.145	365.4	0.1827
MJ-1	Diesel	336	1		0.76	255.36	0.13	0.04	13.44	0.00672	0.03	10.08	0.00504	0.145	48.72	0.02436
NF-2	Diesel	336	16		0.11	591.36	0.30	0.08	430.08	0.21504	0.01	53.76	0.02688	0.01	53.76	0.02688
MC-1A	Diesel	336	7		0.42	987.84	0.49	0.27	635.04	0.31752	0.27	635.04	0.31752	0.071	166.992	0.083496
A/M27M-1	Diesel	336	3		0.5	0.18	0.00	12.25	12348	6.174	0.28	282.24	0.14112	0.145	146.16	0.07308
Total Emissions							**6.39**			**12.17**			**0.96**			**0.63**

Source: AFCEE based on Tables 40-1 and 40-2; Military Aircraft and GSE Assignments/Military Aircraft GSE Emissions Factors, AFCEE Mobile Guide, May 2010
Notes: GSE = ground support equipment; LTO = landing and takeoff cycle; 1b = pound; hr = hour; yr = year; NOx = nitrous oxide; CO = carbon monoxide; VOC = volatile organic compounds; PM = particulate matter
1. Assumptions: Proposed Action will add 336 flights to Dover mission: 1 flight = 1 GSE operational cycle

APPENDIX E
DOVER AFB FACILITY IMPROVEMENT PROJECTS

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Dover AFB MILCON Programs

FY	Project Number	Description
04	FJXT043003	Air Freight Terminal
05	FJXT033002	Air Traffic Control Facility
06	FJXT063000	Dormitory (144 Room)
09	FJXT993002	Fitness Center
08		Joint Personal Effects Depot (JPED) (Army BRAC)
09		Armed Forces Medical Examiner System (AMFES)
08	FJXT073010	Outdoor Recreation Facility (ODR)
09	FJXT073030	Consolidated Skills Center
06	FJXT025000A	Youth Center (NAF)
08	FJXT085000	Shoppette/Gas Station/Class Six (NAF)
07	FJXT076000	Weapons Vault (P-341)
10	FJXT033003	Consolidated Communications Facility
10	FJXT023004	Precision Measurement Equipment Laboratory
10	FJXT093000	Chapel Center
10	FJXT103000	Security Forces Complex
11		Fuel Storage Tank and Fuel Operations Building
16	FJXT123000	Aircraft Parts Storage
17	FJXT073000	Intransit Munitions Storage
05	FJXT055000	Temporary Lodging Facility (NAF)
15	FJXT113000	Logistics Readiness Complex
12	FJXT133000	Aircraft Hangar
05	FJXT001050	Small Arms Range (O&M)
06	FJXT935002	Aero Club (NAF)
08	FJXT961042A/B	Construct Auditorium/Repair Facility (O&M)
14	FJXT043000	Visitors Quarters
18	FJXT183000	Aircraft Maintenance Hangar/Shops Phase 2

Source: Dover AFB 2008
Notes: BRAC = Base Realignment and Closure; NAF = non-appropriated funds; O&M = operations and maintenance; P-341 = O&M funds

Dover AFB Major O&M Programs

Project Number	Description
FJXT069000	Addition to SFS (Facility 910)
FJXT049002	Repair Reserve Headquarters (Facility 202)
FJXT051034	Demolish Chapel (Facility 419)
FJXT081018	Demolish VAQ (Facility 802)
FJXT961042A	Construct Auditorium (R&M) (Facility 261)
FJXT098000A	Construct Drive-Up Pharmacy (Facility 300)
FJXT088003	Repair Exterior Medical Facility (Facility 300)
FJXT961042B	Repair Force Development Center/ALS (R&M) (Facility 261)
FJXT00100810	Demolish Admin (Facility 447)
FJXT041008	Repair Taxiway Charlie (R&M)
FJXT051003	Repair Taxiway Echo (R&M)
FJXT081029	Repair Aircraft Parking Apron (R&M)
FJXT071024	Bury Overhead Utilities Basewide (S/R)
FJXT061023A	Install Air Conditioning Arnold Education Facility (R&M) (Facility 899)
FJXT061023B	Repair Arnold Education Facility (Facility 899)
FJXT0510141	Demolish Admin (Facility 1350)
FJXT0510142	Demolish Central Heating Plant (Facility 617)
FJXT081005	Demolish Youth Center (Facility 3499)
FJXT9910101	Demolish Facility 439
FJXT031005	Repair Runway 01/19 (R&M)
FJXT0510143	Demolish Covered Storage (Facility 1315)
FJXT0010691	Demolish Abandoned Airfield Pavement
FJXT101000	Demolish Bio Engineering Facility 312

Source: Dover AFB 2008

Dover AFB C-17 Facility Improvement Program

Project Number (FJXT)	Building Number	FY	Funds Type	Description	Anticipated Completion Date
063020	515/639	2006	MILCON	Parts Store	CMP
053013	208	2006	MILCON	Flight Simulator	Dec-07
043012	209	2007	MILCON	Aircrew Life Support	May-09
053012	715/945	2007	MILCON	Alter Hangars	Apr-09
063010	721	2007	MILCON	Add/Alter Composite Maintenance Facility	Nov-08
063013	723	2007	MILCON	Engine Storage	Nov-08
051035	204	2006	TWCF	Renovate 3rd Airlift Sq Ops	CMP
069001	270	2007	AFRC	Add/Alter Reserve Sq Ops	Mar-08
071049	794	2007	TWCF	Construct Addition CTK Facility	CMP
071039	714	2007	TWCF	Alter Aperture Doors	Feb-08
061047	722	2006	TWCF	Modify Avionics for CATE	CMP
9910519	715	2006	TWCF	Repair Apron pavement	CMP
031015	714	2009	TWCF	Expand Wheel & Tire Shop	Jun-09
086000	760	2008	P-341	Construct Addition AMXS Facility	Jun-09
071003	65331	2007	O&M	Repair Runway 14/32/Install Landing Zone Lighting	Sep-08
071043	501	2006	O&M	Repair Base Operations (COMSEC Room)	CMP
031013B		2007		Repair Taxilane Alpha	CMP

Source: Dover AFB 2008

Notes: MILCON = Military Construction; TWCF = Transportation Working Capital Fund; AFRC = Air Force Reserve Command; O&M = Operations and Maintenance; P-341 = O&M funds; AMXS = Aircraft Maintenance Squadron; CATE = computerized avionics test equipment; CMP = completed; CTK = consolidated tool kit; COMSEC = communications security

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